UNIVERSITY OF KWAZULU-NATAL

MANUFACTURING COMPANY FAILURE AND UNDERPERFORMANCE IN THE MANUFACTURING SECTOR A MAJOR CONCERN THREATENING SURVIVAL OF INDUSTRY

By
Sarah Tsitsi Dinha
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TO WHOM IT MAY CONCERN

Due to the strategic importance of this research it would be appreciated if the contents remain confidential and not be circulated for a period of five years.

Yours Sincerely

Sarah T. Dinha

DECLARATION

This research has not been previously accepted for any degree and is not being currently submitted in candidature for any degree.
I declare that this Dissertation contains my own work except where specifically acknowledged.

Signed: 

Date 7th July 2008 116065

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ABSTRACT

Operations management is a broad subject that offers industry various planning and control philosophies and techniques on how best to manage all processes within an organisation. However, the macro environment in which companies are operating also affects the application of these techniques and philosophies. It is therefore important to understand the extent to which these tools can be applied by industry that is operating in an environment characterised by unpredictability.

The manufacturing sector decision makers in Zimbabwe have been blaming the under performance and failures in the sector to the macro economic conditions which they claim is not conducive to business operations. Research has been conducted to investigate the challenges that this sector is facing and whether the application of operations management strategies and techniques could counter these challenges.

This research is guided by the hypothesis that "The manufacturing sector's failure to strategically reposition itself in the current socioeconomic environment is the major contributor to its present distress". The methodology used is one consistent with the exploratory nature of the research and both quantitative and qualitative techniques were applied where data was obtained from personal interviews, questionnaires and articles on related topics.

The findings of the research reveal that external factors (macro-economic conditions) are the reason for the under performance or failure of the manufacturing sector. These findings therefore rebut the initial hypothesis as false given the empirical evidence on the ground. It is recommended that companies in the manufacturing sector pursue investment strategies or form alliances with export earning companies internally and externally. Companies could also pool together financial resources to purchase equipment that produces a common output.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

1.1 INTRODUCTION

1.2 GENERAL BACKGROUND TO THE AREA OF STUDY

One of the major economic forces in the Southern African region prior to 1990, Zimbabwe is reeling under its worst economic performance. Several years of inadequate business and political performance have bruised the once vibrant young economy. The decline over the past five years can be attributed to a combination of external and internal factors. The controversial manner in which the implementation of the land reform programme was carried out coupled with the drought conditions that were experienced by the Southern African region between 2001 and 2003 had a negative bearing on real output growth.

Macro – economic difficulties seen through spiralling inflation, acute shortages of food and basic commodities, foreign currency shortages, huge external debt, and ever declining investment have continuously put pressure on Zimbabwe's economy. The IMF Article 2004 Mission report estimates that a cumulative 30 % of GDP has been shed since 1999 due to application of inconsistent government policies particularly monetary and fiscal policies. A comparison of Zimbabwe's real GDP growth with its regional counter-parts is shown in Figure 1.1.

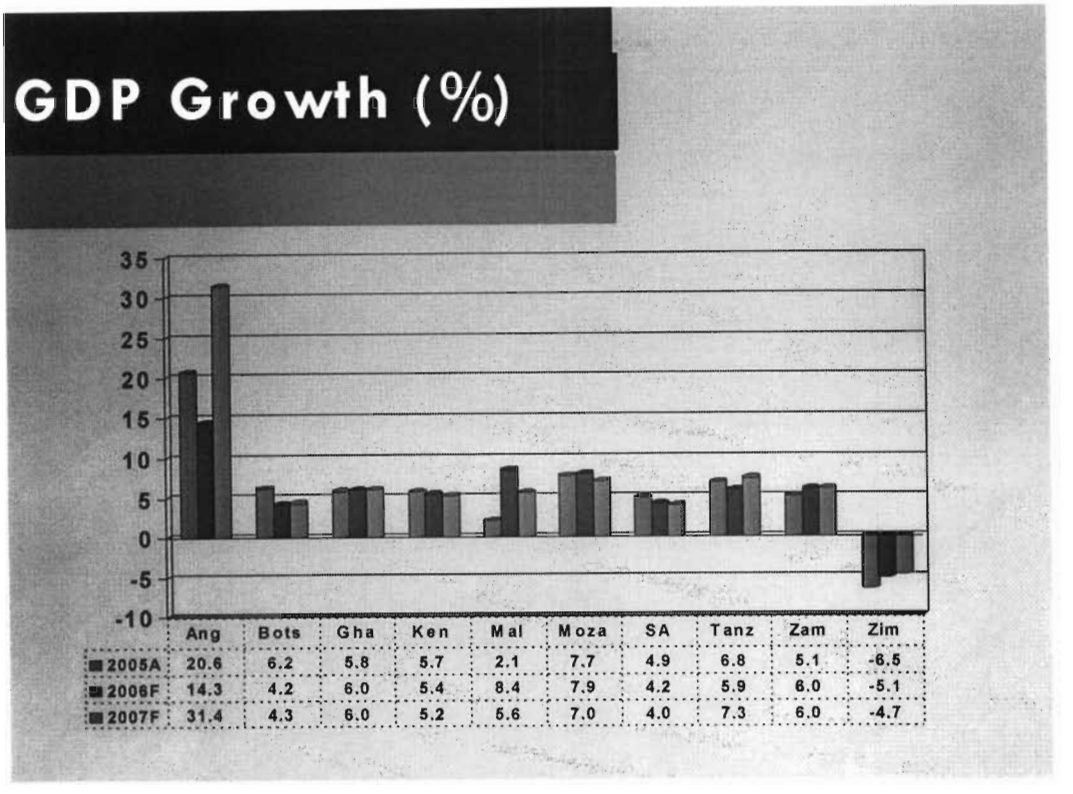

Figure 1.1 Comparative GDP 2005-2007

Source – IMF World Economic Outlook – Publications September 2006.p 196

The government adopted some inconsistent policies at the expense of business. These included among others, price controls, management of exchange rates and creating an environment where labour made demands that ignored other input costs.

The country saw the birth of the parallel market, where money and goods were traded at unofficial rates. Corrupt activities began to surface. Political tensions started to build up and the rule of law was not observed. The international community lost confidence in the running of the economy, thus freezing any form of financial aid and support. As a result of inadequate financial assistance, the Millennium Recovery Plan (MERP) that the government had launched in August 2001 as a short-term 18-month recovery program was rendered ineffective (Reserve Bank of Zimbabwe Report, 2004). The main objective had been to restore stability on the economic side. As a follow up initiative, government introduced the National Revival Programme (NERP) meant to find short and long term solutions to the economic challenges. The major difference with the previous programme

was the latter involved all stakeholders, i.e. government, private sector and labour. Although donors and industry received the programme with optimism, it has not delivered to expectations. (www.czi.co.zw)

Zimbabwe's industry continues to succumb to economic pressures. There is divergence between political and business focus. The body politic continues to focus on centralised controls that deprive business of flexibility. The mutual suspicion that exists between government and private sector on intended motives has overshadowed the importance of looking for ways forward that will ensure economic viability. Industry has tended to wait for ways to tackle problems from the government and is not exploiting other means of addressing some of the challenges. There is need for a paradigm shift by industry, eliminate the current state of self-resignation and blame game and look at positive and constructive creativity.

1.3 RESEARCH BACKGROUND

The manufacturing sector traditionally contributed between 15% and 25 % towards GDP (Reserve Bank of Zimbabwe, 2004). However, this contribution is slowly being eroded due to the poor performance since 1999. This has been due to business constrains such as foreign currency shortages, whose downstream effects have led to chronic fuel and power shortages, unsustainable input and operational costs. The manufacturing sector, which relies heavily on capital and raw material imports for production, was hardest hit. Given that Zimbabwe is an agro based economy, the drought of 2000 to 2003 and the instability in the agricultural sector caused by the land reform program also had a knock on effect on the 60% through put to the manufacturing sector. (www.czi.co.zw)

This study covered key sub-sectors within the manufacturing sector and concentrated on events prior to 2005. This is the period that covers events leading to the present economic challenges the country is facing. Virtually, all manufacturing key sub-sectors exhibited accelerated cost build-ups during the period under review. Capacity utilisation continued

to shrink and a significant number of companies closed down. This is particularly true for textile, clothing and footwear, wood and furniture and food sub sectors.

1.4 MOTIVATION FOR THE RESEARCH

Previous research such as the Confederation of Zimbabwean Industries (CZI) and the Zimbabwe National Chamber of Commerce on the state of the manufacturing sector has tended to dwell on the impact of political decisions to industry, and the problems that the sector is experiencing. The studies have not looked at what industry could do to reduce the impact of these political decisions. This study will add a body of knowledge that despite the economic change, the industry can still compete favourably regionally and internationally if it can strategically focus on maintenance and improvement of production process systems.

1.5 PROBLEM STATEMENT

A significant number of companies in the manufacturing sector have been under-performing in the past five years. This trend is threatening the survival of the country's industry in general. The key problem with Zimbabwe's manufacturers is their failure to cope with challenges of instability in the macro environment. Given the central role the manufacturing sector plays in the economy, it is imperative that this critical sector's viability is restored. The challenge to restore productivity in the manufacturing sector does not only lie with the government but requires an integrated approach involving the manufacturers themselves. The research will focus on providing insights and recommending ways forward to the problems of underperformance and collapses of firms in the manufacturing sector in Zimbabwe.

1.6 OBJECTIVES OF THE STUDY

The study seeks to:

- Determine operational strategies that organizations in the manufacturing sector of Zimbabwe are using.

- Evaluate the effectiveness of operational strategies in use by companies in the manufacturing sector
- Establish effects of the macro-economic environment on the operations of companies in the manufacturing sector of Zimbabwe

1.7 STATEMENT OF HYPOTHESIS

Hypothesis 1

The manufacturing sector's failure to strategically reposition itself in the current socio-economic circumstances is the major contributor to its present distress.

Hypothesis 2

External forces are the major reason for under performance / failure of the manufacturing sector.

1.8 RESEARCH METHODOLOGY

The study calls for an investigation into the causes of the current status of the sector, and an exploratory research approach was applied. Qualitative techniques were applied in conducting the research. Historical reviews of companies' performances were done, to provide an in depth knowledge of how and why performance differed when firms were subjected to the same operating business environment. Unstructured open-ended questions were used in the interviews so as to bring out the issues, observe reactions and get the respondents to participate without restrictions to a few alternatives. Questionnaires were distributed to managers and employees of companies selected by the researcher.

1.9 SUMMARY OF THE STUDY

Chapter 1 is the introduction to the research, which comprises the background of the problem, statement of the problem, objectives of the study, statement of hypothesis and justification of the study. Chapter 2 reviews the literature related to operations management. The reviewed literature will be used in the discussion of the research results. Chapter 3 presents the methodology on how the study is conducted, the

population of the study, the research design adopted, sampling techniques applied, research instruments used and justification of the design and sampling instruments used in the study. Chapter 4 presents the study findings and discussion of the study findings. These findings form the basis of conclusions and recommendations of the study discussed in Chapter 5. Chapter 5 also presents the suggested area of further research as shown by the study findings.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

In order to have an appreciation of the subject of the study, it is critical to understand manufacturing in the broad context of operations management and evaluate the implications on its major components if subjected to a variety of internal and external factors. Manufacturing, a branch of industry, involves the application of tools and processing methods to transform raw materials into finished goods for sale. This effort includes all intermediate processes required for the production and integration of a product's components (Slack *et al* 2000).

2.1.1 Background to the Zimbabwean Operating Environment

a) Sub-Sector Manufacturing Performance (2000-2003)

The table below provides an analysis of how the sub-sectors in Zimbabwe manufacturing industry have fared in the years 2000-2003. The main observation from this table is that none of sub-sectors have registered any notable growth. In fact there is a general decline in the performance of all industries. The only positive growth in 2003 was a meager 0.3% registered in the drinking and tobacco sector. Above all the industry has been moving up and down in the negative. The overall direction though, is a sustained decline in the industry's performance. The worst performers were textiles, wood and furniture and foodstuffs respectively (Confederation of Zimbabwe Industries Policy Paper, 2004).

Table 2.1: Performance of Sectors

Sub – sector (% Growth Rates)	2000	2001	2002	2003	Average
Food stuffs	-12.8	-1.2	-10.1	-25.6	-12.4
Drinking and Tobacco	18.5	-38.4	-11.9	0.3	-7.9
Textiles	-16.6	-47	27.9	-35.2	-17.7
Clothing and Footwear	-3.9	-8.2	-2.3	-3.7	-4.5
Wood and Furniture	-18.9	-4.7	-6.5	-20.8	-12.7
Printing and Publishing	-20.6	-18.2	13.7	-11.9	-9.25
Chemical and Petroleum	-29.3	-20.2	30.5	-14.0	-8.25
Non – Metallic minerals	-2.9	-2.8	-21.6	-29.8	-14.3
Metals and Metal Products	0.1	7.6	-26.2	-0.6	**-4.8**
Transport Equipment	-22.5	-33.8	15.7	-6.3	-11.7
Other Manufactured Goods	-24.2	-4.1	2.9	-35.9	-15.3
All Manufactured	**-6.6**	**-17.4**	**-5.8**	**-11.8**	**-10.4**

(Source: Confederation of Zimbabwe Industries(CZI) Manufacturing Sector Study 2003. page 15)

- All sub-sectors of the economy registered an average negative growth between 2000-2003.
- No sub-sector was insulated from the effects of spiraling decline.

b) Manufacturing Cost Trends (2000-2003)

Table 2.2: Manufacturing Cost Trends

Input cost trends for Surveyed Companies	% Growth in Local Input costs	% Growth in imported input costs
2000	45.4	67.8
2001	150.8	314.9
2002	168.0	249.9
2003	527.0	589.0

Source: CZI Manufacturing Sector Study 2003. page 32)

Factors cited in the primary research, high input costs and hyper - inflation, have been confirmed by the above statistics which reflect sustained increases in both imported and local input costs.

These costs are to a large extent beyond the industry's control as they tend to be imposed by factors such as hyperinflation, sub-economic exchange rate and shortages of foreign currency on the official foreign exchange market.

Imported input costs grew by a larger margin than local input costs, confirming problems being encountered by the industry in sourcing foreign currency as well as an uneconomic exchange rate.

c) Manufacturing Sector Capital Expenditure Outlay

The data below reflects investment strategies adopted by the manufacturing sector since 2000. It will help establish the willingness of the manufacturers to expand capacity as a measure against negative macro-economic factors identified in the primary survey.

Table 2.3: Manufacturing Sector Capital Expenditure Outlay

Investment Outlay	2000	2001	2002	2003
Expansion %	38.9	49.5	55.4	55.8
Replacement %	55.8	57.4	58.8	62.1
Diversification %	0	30.7	24.5	7.3
New Technology %	34.4	15.4	20.8	34.7

(Source: CZI Manufacturing Sector Study 2003. page 40)

Firms decelerated diversification to focus on core business as reflected by the steep decline in diversification expenditure between 2002-2003.

There have been insignificant increases in expansion expenditure between 2000-2003, as a result of firm's unwillingness to take additional risk in a declining industry.

On the other hand replacement expenditure has been steadily rising, reflecting the increases in imported costs coupled with shortages of foreign currency on the official market.

Expenditure on new technology has been accelerating since 2001, reflecting measures being taken by manufacturers to cut on costs in a hyperinflationary environment.
The above statistics reflect that at least the manufacturing industry has adopted some strategies to deal with the negative exogenous factors.

2.1.2 Investment outlays per sub-sector in the manufacturing industry.

The objective of the data below is to demonstrate the efficacy of the investment choices made in the manufacturing industry in the face of an unstable macro-environment.

Table 2.4

Investment Outlay (% of Total Investment Expenses)	Plant & Machinery Investment in 2003	Motor Vehicles 2003
Food	30.7	54.3
Steel and Engineering	50.9	98.5
Foundry	45.2	20.3
Chemicals	18.6	81.5
Pharmaceuticals	-	
Rubber	33.1	58.4
Printing		
Timber	51.9	40.1
Packaging	54.3	43.5
Total	39.7	54.5

(Source: CZI Manufacturing Sector Study 2003. page 41)

- The majority of the firms have been investing more in vehicles than in capacity building through the acquisition of plant and machinery or repairs and maintenance which improves productivity.

- The deceleration of investment in plant and machinery could be attributed to falling consumer demand, shortage of inputs and rising input costs which in turn discouraged production.
- Investment in motor vehicles very high given its non-value addition to operations and its demand of foreign currency.
- No investment in Research and Development.

a) Company closures and production trends

The data below shows the impact of company closures on the output from the manufacturing sector.

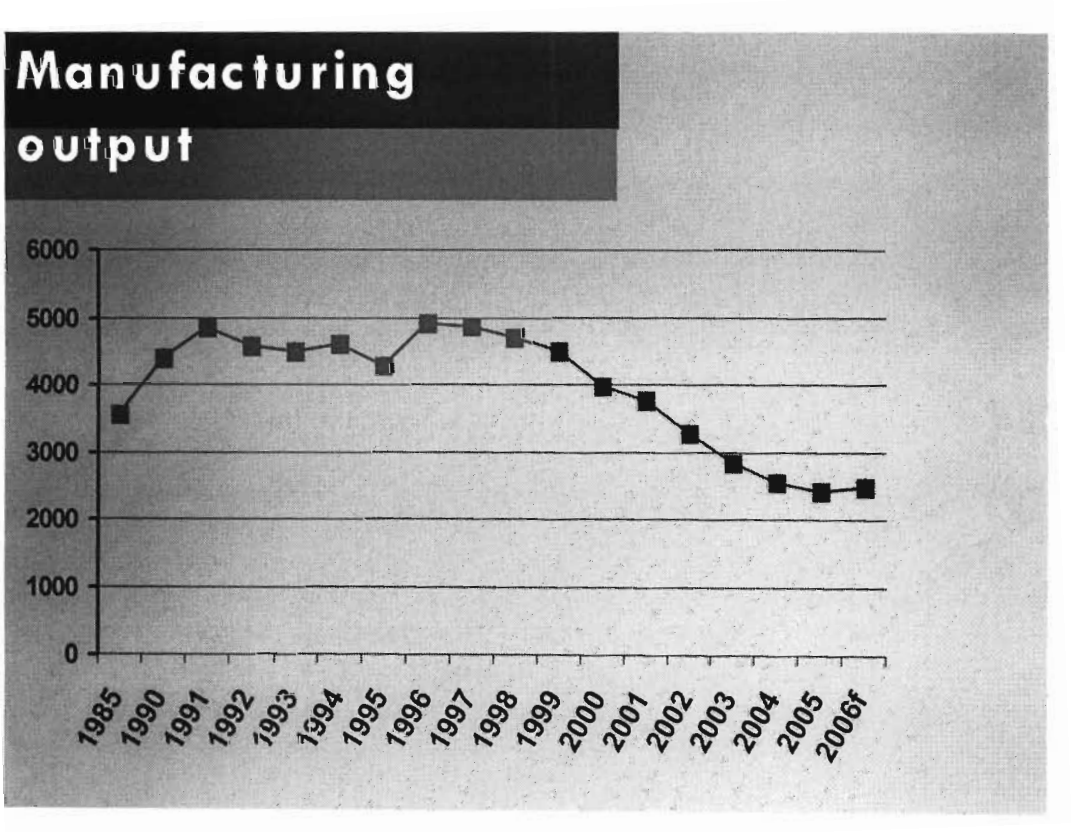

Figure 2.1 Manufacturing trends

Source: Central Statistical Office report 2006.page 31

Table 2.5: Statistics

Company Closures	2002	2003	Companies that scaled down in 2003	Companies Facing Closure in 2004
Leather shoe and allied	12	11	-	4
Furniture	9	12	Most	-
Electronics TV and Radio	5	1	Nearly all	-
Food and Allied	0	6	-	-
Engineering and steel	98	-	15	-
Clothing	2	4		
Textiles	-	6	10	4
Motor	113	-	-	-
Chemicals	2	-	-	-
Printing	7	-	-	-
Total	250	40	25	8

Source: CZI report, 2003 page 50

- Since the year 2000, the manufacturing sector has recorded significant downsizing. Closures have been affected to avoid additional losses.
- The rate of company closures that had slowed down from a peak of 400 in 2000, to 150 in 2001, had started increasing again in 2002, to a level of 250.
- However it is anticipated that output will begin to rise in 2006 due to a forecast good agricultural season.
- The volume of manufactured output shredded a cumulative 25% between 1999 and 2005. The trend is reflected on page 11.

Figure 2.2 shows the impact the reduction in output of the manufacturing sector had on formal employment. Figure 2.1 and 2.2 are following the same trends.

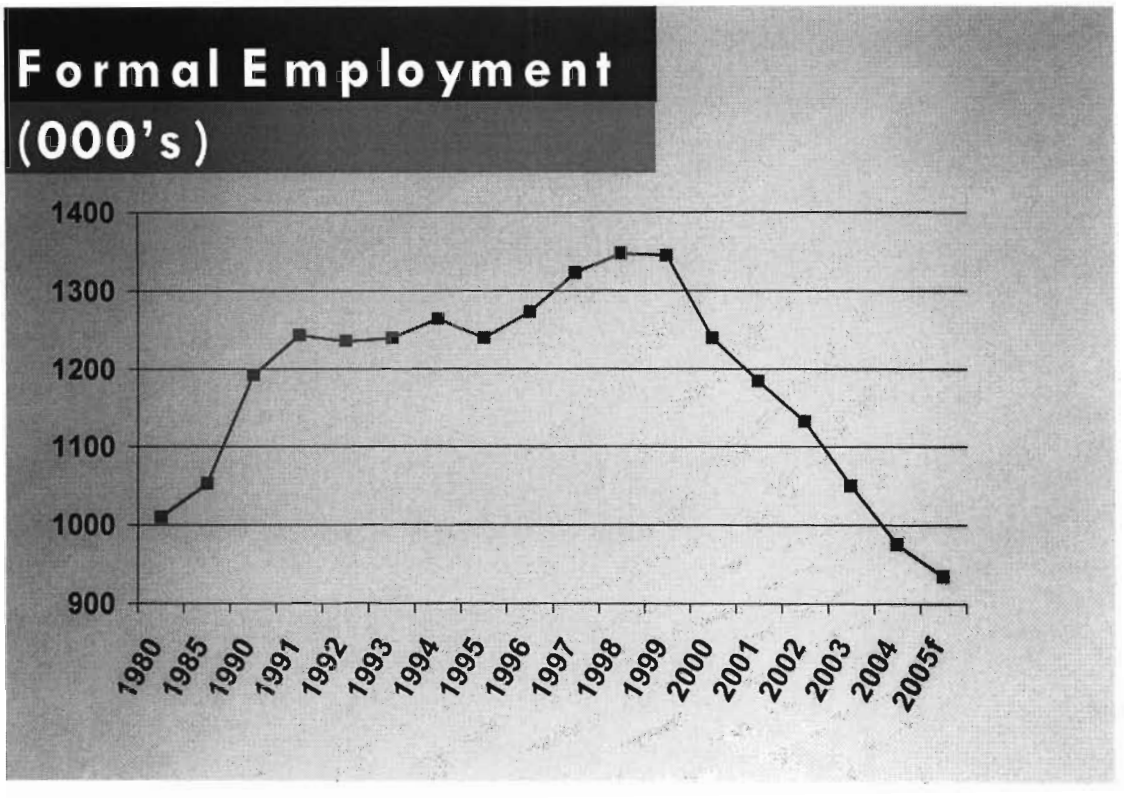

Figure 2.2

Source: Central Statistical Office Publications 1990- 2004 .page C50

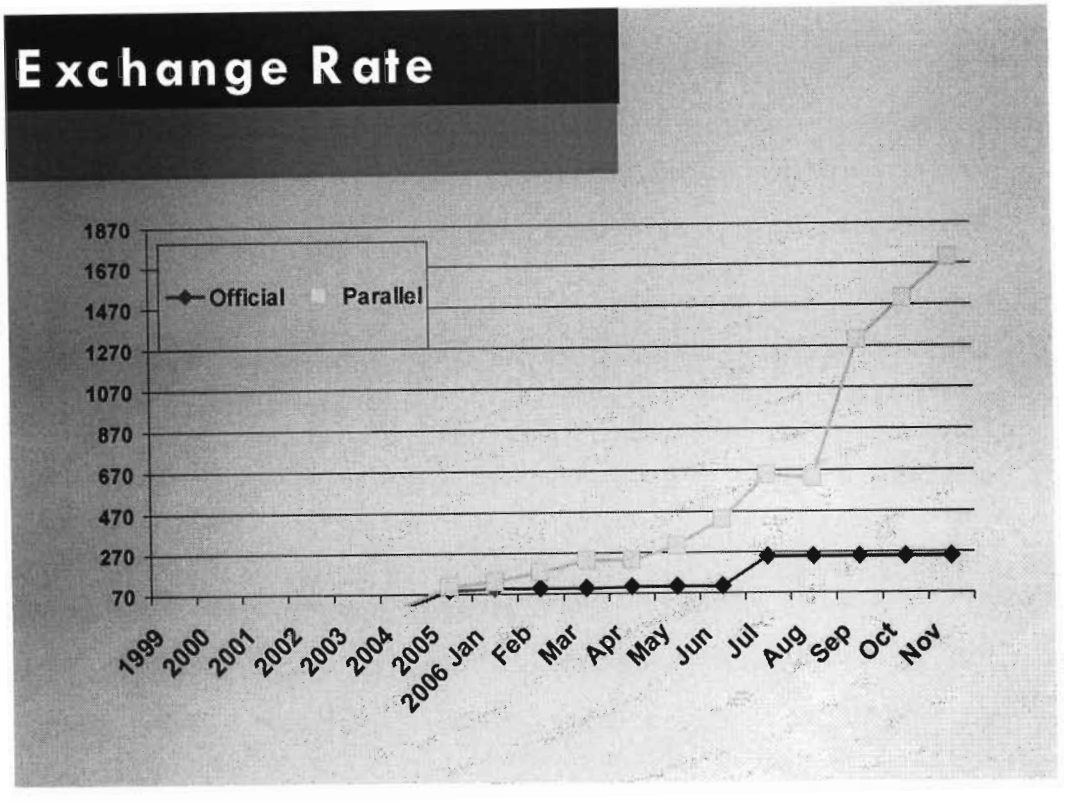

Figure 2.3

Source: Zimbabwe Economic Data- sadcbankers.org

The gap between the official and the parallel exchange rates (Figure 2.3) is widening. The parallel market trend is reflecting the inflationary pressures on the economy

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2.2 OPERATIONS MANAGEMENT

Operations management is about the way goods and services are produced and are pretty much very practical in nature. It involves planning and control, technological and process improvement, setting operations strategies that are efficient, cost effective and ensure product competitiveness (Slack *et al* 2000). Operations management covers all manufacturing processes in an organisation which include raw materials sourcing, purchasing, production and manufacturing and distribution logistics, in other words, the contribution of the production function to the organisation's ability to add value to its goods or services (Marsh, 1995).

2.2.1 The Transformation Model

The concept of operations management is centred on the Transformation model, which is aimed at converting available raw materials and resources through various technological processes into finished products. (Galloway, 1998)

The Transformation Model

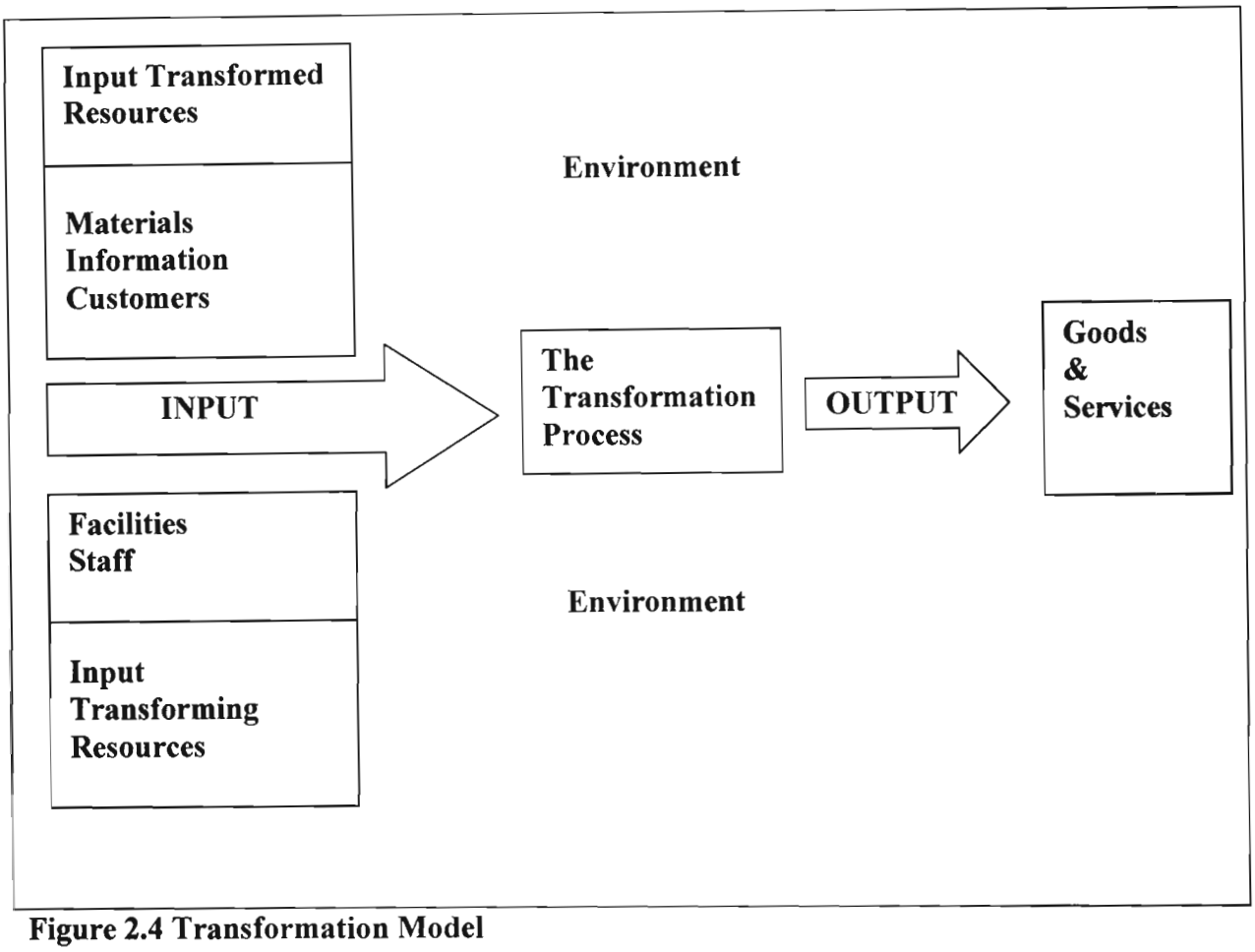

Figure 2.4 Transformation Model

Source: Operations Management: (Slack *et al* 2000:10)

The turbulent environment within which organisations do business means that the operations function and its process systems have to continually adjust to changing circumstances. Operations are vulnerable to 'environmental' uncertainty in both supply and demand (Slack *et al* 2000).

In so doing operations are subjected to various internal and external constraints. Manufacturing, being a subject of operations management itself, primarily involves the

process of transformation of raw material to a finished product. All manufacturing operations are predominantly material processors even though they also make use of information and customers as transforming resources (Albright, 1987). In the process of transforming resources, operations are sometimes subjected to various organisational constraints.

2. 3 ORGANISATIONAL CONSTRAINTS

Sytsma (1997) defines a constraint as anything in an organization that limits it from progressing or achieving its goal. Thus in each organisation the appropriate goal has to be defined. For most businesses the goal is to make money today and in the future. The constraints can be either internal or external.

2.3.1 INTERNAL CONSTRAINTS

Internal constraints differ from one business organisation to the other. They might even differ from one department to the other in the same organisation. Internal constraints, in most cases cannot be divorced from the abilities and performance of management. Consequently such issues like the organisation vision, mission, set objectives, survival strategies, marketing, human resources and company operations demand an evaluation of their performance (Sytsma, 1997).

2.3.2 THE EXTERNAL CONSTRAINTS

The external constraints are all the forces that affect the organisation from outside. Bibeault (1984) in his studies concluded that in 9% of the cases of firm failures, external factors were the sole cause. However, in another 20% both internal and external causes were to blame. He argued that at least two thirds of causes of corporate distress were purely internal.

2.4 OUTSOURCING AND INNOVATION

2.4.1 Outsourcing provides an innovation potential

As technologies and ideas become more integrative, relying on a widening range of skills and areas of expertise, even the largest corporations need to acquire at least some of the knowledge and technology necessary to innovate from external sources (Quintas and Guy, 1995). From a resource-based-view of the firm this is not surprising, because few organizations, if any, have the capability to cover all technologies or understand the correct mix of resources to enable them to innovate and compete effectively in today's rapidly changing markets.

Kodama (1995) argues that innovation depends on the strategic integration of technologies and this requires firms to quickly acquire new capabilities or to ensure the presence of knowledge and technological resources that may be beyond the existing internal capabilities. In this respect outsourcing might help a firm to ensure the presence of appropriate resources to innovate. On the other hand benefits of outsourcing innovation have been overstressed, and can be strategically dangerous if seen as a substitute for the development of long-term internal capabilities in core areas.

However, Chesbrough and Teece (2002) suggest that analysing whether the resources and capabilities need to be acquired or just present (for a period of time), is not enough for outsourcing innovation. They argue that a firm needs to assess whether the innovation they are working on (or they may need) is complementary to other technologies (systemic) or independent from them (autonomous). In this respect it may be a mistake to outsource the development of a distinct idea, product, process that is very dependent on the evolution of ideas, products, processes developed by other firms (inclusive competitors). The firm should rather cautiously enter into alliances to learn about the complementary factors. For example, a company working on fuel cell technology may not want to outsource further research even though they do not have the resource base to do it themselves. The knowledge spill-over might be too significant. On the other hand, it

may be a bad idea to internally keep an idea, product or process that is generally accepted and that might be innovated-out by new ones.

From this it is expected that in product or service development (product innovation) firms will enter into strategic alliances or acquisitions rather than to outsource to integrate various technologies (Chesbrough and Teece, 2002). The argument being that the technologies used in products become more interdependent. Therefore, companies might want to learn about the interrelatedness of the technologies. Many contributions in literature tend to suggest that a firm's ability to innovate increasingly relies on its ability to identify, access and manage external innovation resources. Oerlemans adds to this observation that succeeding in identifying, accessing and managing those external sources of innovation, strongly depends on a firm's internal resources and aspirations (Oerlemans, 1998).

2.5 BENCHMARKING

It is the use of standard measurements in a service or industry for comparison to other organizations in order to gain perspective on organizational performance. To successfully benchmark, a company must first look closely at its own practices and conduct a rigorous self-assessment. On completion of the self-assessment, the company has a good idea of where it is regarding each quality issue and can successfully compare itself to other companies. The self-assessment must be honest and thorough. It should identify areas where weaknesses exist, but should also highlight strengths. Improving weaknesses that are identified should be tied to stated company strategic aims. By benchmarking against the best companies in the world, a company can aspire to be as good as those companies and can surpass the competition in its own industry. (www.reference forbusiness.com).

Xerox formally developed the benchmarking process in 1979 (Rao *et al*, 1996). Initially benchmarking efforts were for the purpose of comparing unit-manufacturing costs but it has now become a study of processes and a significant strategic tool. Benchmarking can be defined as a systematic and ongoing process of measuring products, services and

practices against external partners or competitors in order to achieve improved performance (Strategic Planning Institute Council on Benchmarking, 1995).

Benchmarking is a manager's tool for determining whether the company is performing particular functions and activities competitively, whether its costs are comparable to those of competitors, and which activities and processes need to be improved. It is a way of learning, which companies are best at performing certain activities and functions and then imitating or improve on their techniques (Strickland, 1999).

2.5.1 Performance improvement

Benchmarking allows organizations to define specific gaps in performance and select processes to improve. It provides a vehicle whereby products and services are redesigned to achieve outcomes that meet or surpass customer expectations. Performance gaps discovered can provide objectives and action plans for improvement at all levels of the organization and promote improved performance for individual and group participants. However, benchmarking should be implemented in the cycle plan-do-check-action to ensure continuous improvement (Juran and Gryna, 1993). This concept is supported by Spendolini (1992), who emphasised that in order to realise gains from the investments made in continuous quality improvement in terms of a desirable customer orientation, improvement efforts must be internalized, and to achieve this goal, the benchmarking process must be implemented by following a series of sequential and logical stages:

- Think (Identify what is to be benchmarked),
- Act (Form the benchmarking team or teams, identify benchmarking partners and collect the benchmarking data),
- Evaluate (Analyse the data and determine performance gaps),
- Plan (develop plans and implement) and,
- Look ahead (Achieve benchmark goals and think of continuous improvement).

On the other hand continuous improvement in regard to organizational quality and performance focuses on improving customer satisfaction through continuous and

incremental improvements to processes, including by removing unnecessary activities and variation that are non-value adding. Variations identified are addressed immediately.

2.6 TOTAL QUALITY MANAGEMENT

TQM is concerned with the improvement of all aspects of an operation. It also assists in giving direction on where and how improvement should be done. TQM philosophy covers all parts of an organisation, and aims at doing things right the first time with the ultimate objective of satisfying the needs and expectations of customers.

Originated by Armand Feigenbaum, as Total Quality Control, his definition was as follows"

"Total quality control is an effective system for integrating the quality development, quality maintenance, and quality improvement efforts of the various groups in an organization so as to enable production and service at the most economical levels which allow full customer satisfaction." (www.QualityGurus.com)

Total Quality Management has also been defined as "managing the entire organisation so that it excels on all dimensions of products and services that are important to the customer" (Chase, Jacobs, Aquilano, 2004. p 274).

New technology and improved communication has made today's world a global village and as such no single supplier can boast to be a monopoly in any one market. Hence the supplier should seek to gain and retain the customer by meeting and surpassing their expectations in terms of quality and price.

Besterfield *et. al* (2001) defines TQM quality in terms of the three words as follows:

- Total: Made up of the whole (that is, the whole organisation).
- Quality: Degree of excellence a product or service provides.
- Management: Act, art or manner of handling, controlling, directing and so on.

Thus TQM is the art of managing the whole to achieve excellence. It is both a set of guiding principles and philosophy that make up the basis of a continuously improving organisation. It seeks, through quantitative methods and human resources to improve all the processes within an organisation and exceed customer needs now and in the future. (Chase, Jacobs, Acquilano, 2004).

Nowadays quality thinking dominates the entire manufacturing and business sectors and management functions. Quality management has become imperative. Continuous quality improvement is pivotal in achieving customer satisfaction. The prime objective of Total Quality Management is to get rid of defects at source rather than yield poor quality at the final stage of production. In essence, the primary thrust is to do things right first time, every time. The researcher believes that ethos requires a paradigm shift in staff attitudes and work ethics. Ross (1996) defines Total Quality Management (TQM) as an integration of all functions and processes within an organisation in order to achieve continuous improvement.

Ho and Fung (1998), view TQM as a management approach of an organisation centered on quality based participation of all its members and aiming at long term success through customer satisfaction. TQM requires involvement of the whole organisation from top management to the workers. It is the mutual co-operation of everyone in the organisation and associated business processes to produce products or services, which meet the needs and expectations of customers. Oakland (1994) perceives TQM as an approach to improving effectiveness and flexibility of the business as a whole. It is an essential way of organizing, involving the whole organisation in every department, every activity and every person at every level.

Zairi (1991) said that TQM is a positive attempt by the organisation concerned to improve structural, attitudinal, and behavioral and methodological ways of delivering to the end customer. Total Quality Management should then be the set of practices that enable an organisation to deliver quality products or services. It has also been described as a way of managing an organisation so that every job, every process, is carried out right first time and all the time.

2.6.1 Measurement

Measurement is another key principle of Total Quality Management. It is done through the analysis of collected data to determine the status quo, identify needs of customers, and monitor performance. Things to be measured include customer satisfaction, employee satisfaction, expectations, and costs of quality. According to Oakland (1995), in the cycle of never ending improvement, measurement plays an important role in:

- Identifying opportunities for improvement (quality costing),
- Comparing performance against internal standards (process control and improvement) and,
- Comparing performance against external standards (benchmarking).

Oakland listed the following as the main reasons why measurement is needed and why it plays a key role in quality improvement:

- To ensure customer requirements have been met,
- To be able to set sensible objectives and comply with them,
- To provide standards for establishing comparisons,
- To provide visibility and provide a "scoreboard" for people to monitor their own performance levels,
- To highlight quality problems and determine which areas require priority attention,
- To give an indication of the costs of poor quality,
- To justify use of resources and,
- To provide feedback for driving the improvement effort.

Unruh (1996) believes that organisations use measurement systems to understand whether customer values are being met and hence whether market share is increasing or not. He states "measurements systems are created to guide employees' behavior so that they can understand and satisfy what customers reveal are their ultimate values". According to Dahlgaard (1998), knowledge of customers' experiences of products and services is essential before the processes necessary for creating customer satisfaction can be improved. More and more firms are therefore concluding that, to realize the TQM

vision, they must first set up a system for the continuous measurement, collection and reporting of quality facts.

The quality process must start with measurement so that future operations will be based on facts and not on conjectures. This is why Asher (1996) contends that without some form of measure it is impossible to gain any objective assessment of performance. It is only by measuring that one can determine the processes that require improvement. Wilkins (1994) says that you can't manage what you don't measure. To sustain top management commitment, there must be a feedback system through measurement. There should be a continuous improvement of the costs of quality. The measurement of quality is one of Philip Crosby's principles. TQM gurus concur that quality must be measured to direct efforts to improve from some base (Ross, 1995). Asher (1996) observed that measurement is the only way to plot progress on a path of improvement from the existing to the desired state of affairs.

2.6.2 Process Chain

The activities that take place in an organisation can be broken down to basic tasks or processes that are linked. A business process can be defined as any set of activities that produce output, from a combination of inputs that meet the needs of customers. Wilkinson (1998) believes that organisations may be conceptualized as quality chains that cut across conventional internal boundaries. The processes are linked from the supplier to the consumer.

In a Total Quality organisation, each process has a customer and the only distinction is that the consumer is an internal customer. A process in the chain uses as its input the output from another process or task. The department or process supplying is not in anyway different from the organisation's external suppliers and has to recognize the receiving process as its customer. The process chain can therefore be broken at any point by one person, task or piece of equipment not meeting the requirements on the way to the interface with external customers.

This problem can only be addressed by focusing equally on internal customers' satisfaction and external customers. In this way, Wilkinson (1998) suggests that TQM attempts to emphasize that all employees are ultimately involved in serving the final customer, so that quality matters at all stages. Any weak link or break at any point in the internal customer-supplier chain may find its way to the interface between the organisation and the external customer (Thiagarajan and Zairi, 1997). World-class organisations ensure that everyone within the organisation understands that they are dependent on one another, as far as work is concerned, and continuously ensures that the necessary quality at each interface meets overall customer expectations (Evlo 1997).

2.6.3 Operations improvements

Companies are faced with a lot of challenges in respect of continuously measuring their performances to satisfy the five objectives, which are the speed of its operation, cost effectiveness, dependability, flexibility and quality aspects (Slack *at al* 2000). Various methods are used as performance measures for each of these objectives. The aim of performance standards is to be able to identify areas of potential improvement within an operation and immediately address it. This is done through use of standards, and benchmarking (Cachon, 1998).

2.6.4 Performance Standards

These can be historical, that is based on what has been achieved in the past and considered the best outcomes given the current state of the plant and machinery then. Most companies maintain information on production statistics and these usually take into account a number of variables under which the results were achieved. This method needs continuous review as conditions of machinery and its performance may change overtime which may render the targets unachievable. Questions that then need to be asked are whether the operation is still producing with machinery the same age as before, whether the maintenance patterns are consistently being applied and whether the environment, which affects the supply of maintenance parts, is still conducive (Carnegy, 1995).

Targets can also be set such as those incorporated in the budget planning. These would usually take into account the current state of the plant and skills available,
the environment in which operations are being undertaken and any known limitations. Usually this is driven by the effective capacity available.

Absolute and competitor performance standards are also useful in measuring an operation's own performance. Absolute is basically looking at the ideal situation where everything is functioning without any disruptions in the system, a situation that may never exist and therefore the standards remaining purely theoretical. On the other hand the competitor-based measurement is strategically aiming at examining what the competitor is doing right and try to apply those best practices as well. However, the limitation is normally the availability of that important information from a competitor, as they would want to jealously guard their position in the market. The information may not be easily accessible (Cook and Campbell, 1979).

2.6.5 BUSINESS PROCESS RE - ENGINEERING (BPR)

Founded by Michael Hammer in 1990 BPR advocates that companies should reconsider their processes in order to maximize customer value, while minimizing the consumption of resources required for delivering their product or service. (www. wikipedia.org). Operations improvement can take one of the two approaches, the more radical breakthrough approach or the continuous improvement now commonly referred to as kaizen, (Japanese meaning continuous improvement). Business Process Re-engineering (BPR) is a typical breakthrough approach which involves a complete rethinking and redesigning of all cross functional processes to achieve a desired outcome. It is not a cheap approach to improving processes as it may involve huge capital expenditure where design may be altered. BPR mainly involves the use of flow charts, which give a detailed understanding of the process before changes are made.

It is usually applied where organisations feel the urgent need to change in response to a situation. The need to reduce costs or expenses, competitive pressure, poor customer

satisfaction and poor quality of products are cited as the main reasons for applying the BPR concept. Hammer and Champy (1993) define BPR as;

The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed.

Development of Business Process Re-engineering

Frederick Taylor suggested in the 1880s that the purpose of re-engineering is to "make all your processes the best-in-class." Managers were being advised that they should use reengineering methods to discover the best processes for performing work. BPR echoes the classical belief that there is one best way to conduct tasks. In Taylor's time, technology did not allow large companies to design processes in a cross-functional or cross-departmental manner. It therefore means that specialization was the state of art method to improve efficiency given technology of the time. In the early 1990s, Henri Fayol originated the concept of re-engineering. Businesses operated with the objectives of seeking to derive optimum advantage from all the available resources.

Hammer and Champy are of the view that BPR has so far failed to demonstrate the power and applicability that classical ideas such as division of labour have demonstrated. Cyert and March, point out that conflict is often a driving force in organizational behaviour and this is demonstrated where BPR attempts to stress teamwork, yet paradoxically, it must be 'driven' by a leader who is prepared to be ruthless. Thomas Davenport is not for the idea of separating design of work from its execution, for example, having a small committee from outside to come and prescribe the best way to carry out certain tasks for the many people in the organization.

Importance of Business Process Re-engineering

BPR is used often used by many companies as a disaster recovery program. It is used to cut costs with the aim of returning to profitability. When competition intensifies and the company becomes over exposed, BPR is employed as a solution. For example, Star Vault Inc, a medium-sized entertainment company illustrates this conundrum. After BPR, Star Vault returned to short term profitability by sacrificing its internal production, instead of simply improving the processes, the company eliminated non-value-adding activities and evaluated which organizational elements were relevant to the strategy. As a result, the company now has the opportunity to sustain and increase market share (Dahlgaard, 1998).

To be effective, any way to improve the way people work must be evolutionary, not revolutionary. The long history of miscarriages of centrally planned radical reforms, in addition to re-engineering's as-yet-dismal record of accomplishment suggest that evolutionary approaches deliver better and more permanent improvements. Evolutionary changes stimulate morale and imagination creating conditions for rewarding organizational learning and for inspiring employees to discover innovative ways to deal with adversity and competitive challenges (Deming, 1986). Re-engineering process has the advantage of being a choice of last resort when there is no time left to implement other business process tactics.

The characteristics of poorly designed processes are:

(i) Cumbersome, labour intensive processes,

(ii) Extra resources tied up in inefficient processes,

(iii) Processes not supported by the people,

(iv) Wastage and defects and

(v) Unnecessary delays in cycle times.

BPR involves the fundamental redesign of business processes in an attempt to achieve dramatic improvements in the organizational areas of cost, quality, flexibility, speed and service. In today's dynamic business world, customers demand quality products and services that are at the same time affordable, and available. Price and quality can no longer be considered competitive advantages, but rather competitive necessities. As a result firms seek to reduce costs, speed up processes and enhance flexibility and responsiveness while at the same time deliver top quality goods and services so as to achieve sustainable competitive advantage (Deming, 1986).

Hammer and Champy (1983) emphasize that it is no longer sufficient to execute traditional tasks better, rather the realities of the current competitive environment require that the old "individual-based, task-oriented" management concept be discarded completely and replaced with a 'team-based process management concept". BPR therefore entails a radical rethinking of an organization and its cross-functional, end-to-end processes (Hammer, 1983). BPR attempts to identify and implement world-class best practices and breakthrough opportunities for the core processes of the business. The primary enablers in BPR are developments in the information technology and organizational design. BPR involves a rethink of every dimension of a company and its activities. It requires radical change in all aspects of organizational life in terms of how employees conduct their operations. It leads to the elimination of interdepartmental boundaries, a flattening of the organizational hierarchy and the adoption of self managed process teams.

Generally, what is important in the BPR process is gaining widespread support for change. If support of those who know how the business operates is gained, then they may contribute to lasting improvements in business processes. Many companies often foresee change poorly. They quickly go for downsizing, dismiss employees on a large scale, and give incentives for employees to resign voluntarily, paralyze survivors with fear and aversion to taking initiative. Getting rid of people whose skills have become obsolete reflects the organization's failure to innovate and learn. Process improvement

continues for the lifetime of a company, with each major improvement bringing forth new payoff opportunities.

2.7 PLANNING AND CONTROL

The core of operations is planning and control. It is concerned with formulating strategies that will assist in managing the ongoing activities of an organisation's operation within the constraints imposed by its design, resources and the unpredictability of certain environments. It is about application of methods that are flexible enough to respond to changing supply and demand situations, which have to be cost effective, quality oriented, yet at the same time giving customer satisfaction. Planning is usually based on a set of expectations, and control is dealing with deviations from these expectations or variables. For example, suppliers may not deliver on time, machines may breakdown more frequently, staff may be absent for one reason or the other, demand patterns may change and prices of products may be controlled. Any one of these may cause a plan to become unworkable (Evlo, 1996).

There are two approaches to planning and control, the traditional approach and the contemporary approach. Their objectives are the same, which is to reliably produce quality products and services that satisfy the customer, using cost effective methods and in the quickest possible time. The traditional approach applies more insulation methods to planning, ensuring that there are minimum stoppages in the process by creating or holding inventory at various stages in the process. On the other hand, contemporary approaches emphasize elimination of non- value adding activities from the production process (Slack *et al* 2000).

Production capacity planning and management

One of the major functions within operations is production. It involves use of all resources or factor inputs that are required to produce a good or service. The primary objective is to determine the quantum of production output with varying amounts of factor inputs, in other words the maximum amount of output attainable from an alternative combination of factor inputs. The production function represents maximum

technical efficiency in any operation. This function underscores the essential relationship between resource inputs and product output. (Schiller, 2000: p 427).

Production methods vary and depend on the purpose, product and design for which it was intended. Mass production, also called flow production or repetitive flow production is the production of large amounts of standardized products and permits very high rates of production per worker. It therefore provides inexpensive products but is very capital intensive as it uses a high proportion of machinery in relation to workers. This method was popularised by Henry Ford in his Ford Model T. Thus, mass production is ideally suited to serve large, relatively homogenous populations of consumers, whose demand would satisfy the long production runs required by this method of manufacturing. This production method creates economies of scale whereby the production rate per worker is high and hence reduces the average cost of production. Organisations in mass production require high utilisation levels to justify additional capital investments, as this maximises the return on capital employed (Ghoshi, 2002).

Capacity is described as the amount of resource inputs available relative to output requirements at a particular time. It is affected by maintenance scheduling, breakdowns, unplanned shutdowns and labour unrests, which ultimately result in lost productive time. Capacity utilization is used as a performance measurement. To determine whether capacity is under or over utilized the concept of best operating level is used. This is the level of capacity for which the process was designed and thus is the volume of output at which average unit cost is at a minimum. When the output of the facility falls below the best operating level (underutilization), average unit cost will increase as overhead is absorbed by fewer units. Above the best operating level (over utilization), average unit cost also increases—here due to overtime, increased equipment wear, and heightened defect rates. Capacity utilisation rate is therefore used to reveal how close a firm is operating to its design capacity. (www.pom.edu/p304/ch8ppt.htm)

Dealing with capacity utilisation can be quite complex. There are three alternatives to managing capacity: the level capacity plan, which maintains activity levels constant

irrespective of fluctuations in demand, the chase demand responds to demand fluctuations by adjusting capacity and finally demand management changes demand to fit capacity availability (Gilbert, 1992).

Practice has shown that no one single alternative will achieve the required objectives. A combination of alternatives has been used to address the various issues. Various ways of adjusting capacity range from varying the number of working hours to suit the demand and avoid overtime costs and idle time, and varying the size of the workforce and using more of part time or contract workers. A significant number of companies in the manufacturing sector of Zimbabwe have had to employ one or a combination of the strategies in order to survive (Griffiths, 1993).

Capacity flexibility means having the ability to rapidly increase or decrease production levels in response to demand situations, or to shift production capacity quickly from one product or service to another. Such flexibility is achieved through flexible plants, processes, and workers as well as through strategies that use the capacity of other organizations. Flexible plants are known to record a zero-changeover-time. Using movable equipment, knockdown walls, and easily accessible and re-routable utilities, such a plant can adapt to change in real time (Griffiths, 1993).

Variability in product demand and the processes themselves generally lead to imbalance in production stages, except in automated production lines which, in essence, are just one big machine. There are various ways of dealing with imbalance. One is to add capacity to those stages that are the bottlenecks. This can be done by temporary measures such as scheduling overtime, leasing equipment, or going outside the system and purchasing additional capacity through subcontracting. A second way is through the use of buffer inventories in front of the bottleneck stage to ensure that it always has something to work on (Hartly, 1998).

2.8 OPERATIONS RESEARCH MODELS

What is operations research?

It is a scientific approach to decision making that involves the operations' organisational systems. As its name implies, operations research involves 'research on operations'. Thus operations are applied to problems that concern how to conduct and coordinate the operations or activities within an organisation. The nature of the organisation is essentially immaterial, and, in fact, operations research has been applied extensively in business, industry, the military, civil government and agencies, hospital and so forth (Henry, 1990).

Operations research adopts an organisational point of view. Thus it attempts to resolve the conflicts of interest among the components of the organisation in a way that is best for the organisation as a whole. Operations research has had an increasingly great impact on the management of organisations in recent years. Both the number and the variety of its applications continue to grow rapidly and no slow down is in its sight (Hetzel, 1993).

2.8.1 INVENTORY THEORY MODEL

Keeping an inventory (stock of goods) for future sale or use is very common in business. Retail firms, wholesalers, and manufacturing companies and even blood bank, generally have a stock of goods on hand. Many big companies have saved large sums of money by using 'scientific inventory management'. In particular, they:

- Formulate a mathematical model describing the behaviour system
- Derive an optimal inventory policy with respect to this model
- Frequently use a computer to maintain a record of the inventory levels and to signal when and how much to replenish.

There are several basic considerations involved in determining an inventory policy that must be reflected in the mathematical inventory model and these are illustrated in the following examples (Hetzel, 1993).

Components of inventory model

Inventory policies obviously affect profitability. Some of the costs that determine this profitability are:

- The costs of ordering or manufacturing
- Holding or storage costs
- Unsatisfied demand or shortage penalty costs
- Revenues
- Salvage costs
- Discounts rates

The cost of ordering or manufacturing an amount z can be represented by a function $c(z)$, where c represents the unit price. The simplest form of this function is one that is directly proportional to the amount ordered, that is, $c.z$. Another common assumption is that $c(z)$ is composed of two parts; a term that is directly proportional to the amount ordered and a term that is constant k for z positive and aero for $z=o$. For this case, if z is positive, the ordering, or production cost, is given by k+c.z. The constant k often referred to as the set-up cost and generally includes the administrative cost of ordering, the preliminary labour, and other expenses of starting a production run.

The holding or storage costs are associated with the storage of the inventory until it is sold or used. The costs may include the cost of capital tied up, space, insurance, protection, and taxes attributed to storage. These costs may be a function of the maximum quantity held during a period, the average amount held, or the cumulated excess of supply over the amount required (demand).

The unsatisfied demand or shortage penalty cost is incurred when the amount of the commodity required exceeds the available stock. This cost depends upon the structure of the model. One such case occurs when the demand exceeds the available inventory, and it

is met by a priority shipment, or it is not met at all. The penalty cost can be viewed as the entire cost of the priority shipment that is used to meet the excess demand. A situation where the unsatisfied demand is lost, the penalty cost can be viewed as the loss in the revenue. The penalty cost can be interpreted as the loss of customers' goodwill, their subsequent reluctant to do business with the firm, the cost of delayed revenue, and extra record keeping. This case is known as 'backlogging of unsatisfied demand'. Usually the unsatisfied demand cost is a function of the excess of demand over supply.

The revenue cost may or may not be included in the model. If it is assumed that both the price and the demand for the product are not under the control of the company, the revenue from sales is independent of the firm's inventory policy and may be neglected. However, if revenue is neglected in the model, the loss in revenue must then be included in the unsatisfied demand penalty cost whenever the firm cannot meet the demand and the sale is lost.

The salvage value of an item is the value of a left over item at the termination of the inventory period. If the inventory policy is carried on for an indefinite number of periods, and if there is no obsolescence, there are no left over items. What is left over at the end of one period is the amount available at the beginning of the next period.

In using quantitative techniques to seek optimal inventory policies, a company can use the criterion of minimizing the total discounted cost. Under the assumptions that the price and the demand for the product are not under the control of the company and that the lost or delayed revenue is included in the shortage penalty cost, minimizing cost is equivalent to minimizing net income.

2.8.2 INVENTORY MANAGEMENT

Inventory management is about the application of various techniques to ensure no disruption is incurred in the process. This should be done at a minimum cost. It is a key input in the entire production process in terms of ensuring the smooth running of the production process.

Founded by Joseph Orlicky and Oliver Wight in the 1960s, Materials Resource Planning (MRP) a computer based system, was introduced as an inventory management tool that deals with forecasting demand and using the same forecast figures to source materials.

In coming up with planned material requirements the forecast takes into account:

- The products that need to be produced, and this information is contained in the Master Production Schedule (MPS)
- The materials used in the production of the products also known as the Bill of Materials (BOM)
- Requirements in terms of the time frame to manufacture the goods or materials (the lead time)
- The maximum amount that could be produced at any one time which represents the batch size
- Balances stocks of products and materials as reflected in the inventory file. (www. BBC-h2g2-Material Requirements Planning (MRP)

The objectives MRP are to ensure that materials and products are available for production and delivery to customers, at the same time maintaining the lowest possible inventory levels. MRP makes it easier to plan manufacturing, delivery and purchasing activities.

Another concept applied in inventory management is the Economic Order Quantity (EOQ) model. Originally developed by F.W Harris the objective of the model was to come up with the optimum order level on any product that incurs minimum total variable costs required to order and hold stocks. This concept assists in deciding quantities to be ordered when considering replenishment of stocks. A scientific formula to calculate the optimum order level is derived from calculations done incorporating all storage, working capital, obsolescence, and ordering costs.

Due to the timing difference in the rate of supply and demand at different points in any operation, inventory is created. This inventory is classified into four categories. Buffer inventory is created to counter uncertainties that exist in the supply and demand of a product. It is there to cover for the possibility of a greater demand during the period delivery is scheduled to take place. Cycle inventory is there to compensate for the irregular supply of products. Anticipatory inventory is created when demand fluctuations are significant but relatively predictable. This is usually the case where a company believes there may be disruptions in the supply of the product. Pipeline inventory arises because material cannot be transported immediately, may be due to unavailability of transport making it inevitable not to hold stocks. (Slack *et al* 2000)

Another practice that is common is the application of maximum, minimum and re-order levels. These are pre determined and incorporated into a computer system so that once the threshold of a re-order level is reached; an order is automatically generated by the system. The system will also give warnings where inventory has gone to the minimum level to enable quick decisions to be made.

Forecasting

Forecasting is an essential component of any successful inventory system. However, forecasting need not to be associated solely with problems of inventory control. Indeed, it is extremely rare to think of examples where managerial decisions are made in the absence of some form of forecasting (Hetzel, 1993). Forecasts can be obtained by using qualitative or quantitative techniques. Two distinct quantitative techniques are used in forecasting, both of which are conventional statistical techniques, the time series analysis and regression analysis. A statistical time series is simply a series of numerical values that a random variable takes on over a period of a year to constitute a time series. Time series analysis explores techniques that utilise these data for forecasting the values that the variable of interest will take on in a future period.

Forecasting in general is concerned with an analysis of past time series data in order to estimate one or more future values of the time series. The forecast depends upon the

model of behavior of the time series. Judgmental techniques are, by their very nature, subjective, and they may involve such qualities as institutions, expert opinion, and experience. They generally lead to forecasts that are based upon qualitative criteria. One commonly used technique is to bring together a group of experts who interact with each other and produce a consensus forecast. The most important judgmental technique is called the Delphi method. The method includes the preparation of questionnaires and the analysis of their results (Hetzel, 1993).

2.9 MACRO - PERSPECTIVE

2.9.1 Political, Economic, Social and Technological factors (PEST)

The environment within which companies operate has an influence on their operational strategies. The fundamental issues that affect the running of operations are mainly political, economic, social and technological decisions. In mapping out corporate strategy, managers may use the PESTL analysis. PESTL is the acronym for Political, Economic, Social, Technological and Legal issues of the external macro-environment that affect the strategic development of a business. According to the NetMBA Business Knowledge Centre (2005), such external factors are beyond the firm's control and at times, present themselves as threats. However, changes in the external environment can also present new opportunities. The extent to which these factors constrain a firm's growth depends very much on its size and that it is consistently the smallest firms that are mostly adversely affected by all these constraints .They further argue that generally, firms that operate in countries with underdeveloped financial and legal constraints and higher levels of corruption tend to be more constrained. Table 2.5 below lists some possible factors that indicate some of the essential environmental influences for a business under the PESTL.

Political

Political issues include government policies towards industry, its relationship with industry, including the extent of its intervention in industry operations, the political parties that exist, relations with regional and international communities. More

predominant and recent in third world countries is the need to analyse policies on issues of employment and gender balances, the black empowerment drive and the land redistribution programmes. The impact of the policies could have far reaching consequences on the operations and companies may be required to revisit strategies. (Net MBA Business , 2005)

Economic

Macro economic decisions and policies are also crucial in determining the direction of operations strategies. The impact of monetary and fiscal policies regarding issues like interest rates, the level of taxation, government expenditure and policies towards investment become key in making operations decisions. Fluctuations in exchange rates, statistics on economic growth, inflation, and unemployment levels influence the way operations are run, particularly in most third world countries. These statistics assist in making long and short -term operations decisions. Equally important is the country's infrastructure such as road and communications networks, which have a bearing on transport costs and availability of raw materials. (Net MBA Business , 2005)

Socio - cultural

Understanding the socio- cultural factors of a country in respect of values and culture, attitudes of people towards work, education and health statistics as well as income distribution patterns are key in any operation as these factors have an impact on operations and related decisions. (Net MBA Business , 2005)

Technological

It is important to appreciate the technological aspect of the environment the company is operating in. The speed of change and adoption of new technology is important as it guides the future of technological advancement of the environment. (Net MBA Business , 2005)

Table 2.5: PESTL

Political / Legal	Economic	Social	Technological
Environmental regulation and protection	Economic growth (overall; by industry	Income distribution (change in distribution of	Government spending on research

	sector)	disposable income;	
Taxation (corporate; consumer)	Monetary policy (interest rates)	Demographics (age structure of the population; gender; family size and composition; changing nature of occupations)	Government and industry focus on technological effort
International trade regulation	Government spending (overall level; specific spending priorities)	Labour / social mobility	New discoveries and development
Consumer protection	Policy towards unemployment (minimum wage, unemployment benefits, grants)	Lifestyle changes (e.g. Home working, single households)	Speed of technology transfer
Employment law	Taxation (impact on consumer disposable income, incentives to invest in capital equipment, corporation tax rates)	Attitudes to work and leisure	Rates of technological obsolescence
Government organization / attitude	Exchange rates (effects on demand by overseas customers; effect	Education	Energy use and costs

	on cost of imported components)		
Competition regulation	Inflation (effect on costs and selling prices)	Fashions and fads	Changes in material sciences
	Stage of the business cycle (effect on short-term business performance)	Health and welfare	Impact of changes in Information technology
	Economic "mood" - consumer confidence	Living conditions (housing, amenities, pollution)	Internet!

Source:www.tutor2u.net/business/strategy/PEST_analysis.htm (02/02/05)

2.10 CASE STUDY OF TOGO ON THE EFFECTS OF MACRO ECONOMIC ENVIRONMENT

Increased Government Intervention in Togo in the 1970s

There is a concentration of the civil servants in Lomé, the capital of the Togo. The region where Lomé is located is not taken into account in the regional distribution of civil servants. Kara is the region mostly populated by the kabye tribe. Economic Performance 3/11/05 Page 15 of 40 states that in the second half of the 1970s, the government of Togo

became the predominant economic agent and its policies contributed to the poor macroeconomic performance the country had experienced the rest of the period.

Fiscal Policy

Following the international phosphate rock price increase in 1973, the government was haunted by a complex of grandeur as it called itself a "government of big projects." It embarked on a big expenditure program that the country had never seen before and acted as if such program could be financed indefinitely with windfall resources from terms of trade improvement. The goal pursued through these expansionary policies was to bring about structural transformation in the economy so as to foster sustained growth. Particular emphasis was put on industry because this sector was the weakest of the economy and also because the government believed that development required rapid development of the industrial sector.

Public investment increased dramatically, from 13.4% of GDP in 1973 to 39.6% of GDP in 1979. As a consequence, the formal employment in the industrial (mainly public) sector increased from 8,288 in 1973 to 19,254 in 1979.

Institutionally, the strategy was supported by a favorable investment code. The investment code drafted in 1968 and revised in 1973 and in 1978 was intended to promote the creation of "big" industrial enterprises. Between 1976 and 1980, 15 state-owned or funded enterprises accounted for more than half of the investment made in this sector. Due to their high operating cost, these enterprises could not operate without tariff and non tariff barriers.

Most elements of this highly improvised development strategy were far-fetched and the economy as a whole was not ready for them. Such elements included the building of a petroleum refinery plant in the middle of the oil crisis of the 1970s. The plant was supposed to be supplied with crude oil by some countries through some bilateral trade agreements. However, the agreements were never signed and the plant ended up closing down. Other examples of bad projects included the building of a steel mill that also closed down a couple of years after it started operating.

A few strategic mistakes can be cited. Firstly, most of the projects were highly capital-intensive but the government underestimated subsequent financing needs. The government failed to adopt projects that could make judicious use of human capital, the factor of production it strived to develop with an arguable degree of success. It continued to make the civil service the principal recipient of the qualified labor force. Secondly, the government failed to associate the private sector to this development strategy. In fact, certain elements of the strategy discouraged the private sector as they caused the crowding-out of some firms. In 1976, state-owned enterprises accounted for 68.4%, 47.7% and 100% of value adding in the mining, manufacturing and energy industries respectively.

In 1979, 77% of firms in the modern sector were state-owned or state-controlled. These firms accounted for about half of the modern sector payroll outside the civil service. Economic Performance 3/11/05 Page 16 of 40 states that the development strategy was not accompanied by measures to create a generally enabling environment for industrial development. In particular, the government failed to build adequate development infrastructure such as road and communication networks. The strategy focused essentially on import-substitution activities, which were highly subsidized. Private firms, which produced or imported these commodities, were crowded out. Inefficient public or parastatal enterprises drove more efficient private firms out of the market.

Monetary Policy

Monetary policy did not change much during the period. Overall, the monetary system worked fairly well. However, it was too static and too passive in some regards. In particular, the monetary authorities failed to adjust policy to respond to the shocks that occurred during the period. Firstly, continued and unrestricted use of the resources of the Operations Account did not make the government feel the need to work out a solution to their current account deficit problem. Practices that contributed to aggravations of current

account or external debt positions of the country were not sanctioned thus contributing to the debt crisis experienced by Togo and other member countries (Evlo, 1997).

Secondly, monetary policy lacked dynamism. The central bank did not introduce measures to enable its credit allocation policy to respond to economic difficulties. No action was devised to help reduce member governments' budget deficits. No measure was envisioned to foster fiscal discipline. Governments were free to run deficits as large as they desired, provided they could have such deficits financed outside the monetary system. Togo's record-high deficits in the second half of the 1970s were condoned by the central bank. In fact, the latter made available to member governments credit facilities that were determined on the basis of factors that had nothing to do with the size of budget deficits. More importantly, most member governments including Togo never exhausted the resources allocated to them through these facilities. So, they had the possibility of running even larger deficits.

Trade Policy

The second half of the 1970s was also characterized by an increase in government control over the external trade sector, and aggressive import substitution policies. The government also nationalized the CTMB, the company that produced and marketed phosphate rocks. Through this move, the government controlled over 90% of export revenues. The agricultural export products marketing agency, OPAT that was created in 1964, did not really stabilize the producer prices of the relevant products until the mid-1970s. However, its economic performance served as a mechanism through which financial resources were transferred from producers to the government. The differential between producer and international prices of cocoa and coffee increased during this sub-period, in particular between 1976 and 1978. The ratio of cocoa producer price to international price fell from an average of 41% in the 1970 – 1974 period to 24% in the 1974 – 1978 period. Likewise, the ratio of coffee producer price to international price declined from an average of 31%, in 1970 - 1974, to 24% in 1974 - 1978.

The increase in exported quantities of coffee and cocoa during the sub-period was due essentially to smugglings from Ghana. Baniganti and Lawson (1994) estimate the rate of protection of some of the largest enterprises in Togo. Effective rate of protection (ERP) was generally high even though the cost of domestic resources coefficient suggested that there were inefficiencies in the operation of most the enterprises. Baniganti and Lawson (1994) found that ERP for state owned enterprises, which was on average high as over 200% is very high for some sectors. The average rate of effective protection for textile and leather products was 354% compared to 216.7% for woods and wood products. The textile industry was also highly protected. The Balassa effective rate of protection index reached 614% for the textile industry and a record high of 673% for Togométal. One of the least protected industries was the Ciments du Togo whose effective rate of protection did not exceed 175% in 1979.

Adjustment Policies and Economic Reforms

Due to unsustainable public finance deficit and the debt overhang, the government's behavior changed considerably in the 1980s. The government remained the most important economic agent because of its willingness to carry out economic reforms and also because the public sector remained large. It implemented most aspects of the Structural Adjustment Programs (SAPs), although certain measures of such programs were unpopular. Reduction of the size of the civil service can be politically costly in a democratic regime. Likewise, liquidation or privatization of some non-performing public enterprises was not well accepted by the public, which was concerned not only about job losses, but also about the way these enterprises were sold. Nonetheless, the government felt no pressure from the population to behave one way or another. Due to its authoritarian style, it implemented such programs without consulting the population. Togo was one of the few countries that accepted without any major amendment the structural adjustment aid package proposed by the IMF and the World Bank.

In reality, it did not have much choice given the severity of the government finance crisis the country was experiencing. Current account deficit was brought down in most part of the late seventies. Positive growth was recorded in the second half of the sub-period, but

was quite weak between 1985 and 1990. The recovery was caused principally by a 24% growth in the agricultural sector. Smuggling activities into Togo by Ghanaians were not necessarily due to lower producer prices in Ghana. They were primarily motivated by the opportunity to earn CFA francs that these producers could use to buy (in Togo or other neighboring countries) imported consumer goods that were severely rationed in Ghana. So, inappropriate exchange rate policies (in Ghana) might have made Ghanaian cocoa producers contribute to the prosperity and wealth of OPAT.

The fact that there were many such programs, suggest that they were not often implemented. Economic Performance 3/11/05 Page 18 of 40 notes a 47% growth in the mining sector. The recovery was hampered, on the one hand, by the weakness of the services sector due, in part to the continued contraction of the public sector and, on the other hand, by deteriorating terms of trade. Budget deficit was lower in the first half than in the second half of the 1970s. Official Development Assistance (ODA) increased steadily from US $63 millions in 1981 to US $260 millions in 1990, which was its highest level ever. The country was also granted debt relief through the Paris and London Clubs. From 1984 to 1990, five countries cancelled partially or in totality Togo's bilateral debt following the Toronto Plan, various aid initiatives for Least Developed Countries, or the resolution of the Francophone Summit held in Dakar.

Total debt relief was US$ 315.4 millions. However, this debt relief effort proved inadequate to help the government pay its due debt service on time. Debt service payment had been rescheduled eight times by the Club of Paris. The flow of financial resources from the IMF and the World Bank increased although the country did not implement satisfactorily the adjustment programs it agreed upon with these institutions. World Bank loans increased from US$ 47 million in 1980 to 400 million in 1990 and IMF loans from US$ 33 million to 87 million in 1990.

The Socio-Political Crisis

In the 1990s, the government continued implementing IMF and World Bank-sponsored economic reforms despite the socio-political crisis. The pace of the reforms accelerated,

leading to an even higher degree of liberalization and privatization. However, the socio - political crisis caused a slowdown of economic activity in virtually all sectors. Households' savings and private investment went down, causing long-term reduction of physical capital stock. The problem was aggravated by the economic sanctions imposed on the government by the donor community. These sanctions caused reduction of the flow of foreign direct investment (FDI) and official development aid (ODA). ODA shrunk from 260 millions CFA francs in 1990 to 71 millions in 1999.

Political Economy

For a growing literature (Bates and Devarajan, 1999), political economy is an important determinant of growth. Togo has been one of the countries where political leadership has not changed much over the past forty years. Three presidents have governed the country since 1960, one since 1967. For this reason, Togo has often been labeled to as politically stable among African countries. This stability ended in 1990, as the country has been going through a socio-political crisis since. Interest groups and their role have changed during the 40 years of the study period.

2.11 CHAPTER CONCLUSION

This chapter reviewed literature on operational strategies and models in the manufacturing industries. The major concepts under discussion included theories on survival management of operations, operation research models and the macro-economic industrial analysis through the PESTL model. This chapter ends with a case study of the effects of macro-environmental factors to the general performance of the industry in Togo. This chapter forms the basis on which the study findings are discussed. The next chapter presents the methodology of the study and the associated justification.

CHAPTER 3

3.0 METHODOLOGY

3.1 INTRODUCTION

This chapter will provide information on modus operandi of the study. It is dedicated to the discussion of the research design and the various methodologies used in this study. Furthermore a great deal of discussion will centre on how to do the research in order to collect reliable and valid data for the research questions as well as the overall objective of the study. This entails defining the sampling techniques, the different types of data, introducing and discussing development of research instruments and how data will be processed, analysed and presented.

3.2 RESEARCH DESIGN

Ghoshi (2002) describes a research design as a plan of the proposed research work. Quoting Jahoda, Deutsch and Cook, Ghoshi (2002:20) defines research design as "the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure". Furthermore, Saunders et al (1997) define research as "seeking through methodical processes to add to one's own body of knowledge and hopefully to that of others, by the discovery of non trivial facts and insights". A research design or method is a systematic and orderly approach taken towards the collection of data so that information can be obtained from that data.

Sekaran, as cited by McPhail (2001), describes business research as an organized, systematic, data-based, critical, objective, scientific inquiry or investigation into a specific problem undertaken with the purposes of finding answers or solutions to it. Business research begins with asking questions leading to the learning, explanation,

prediction, experimentation, observation and consequently advancement of the limits of the accumulated knowledge up to date. It can be generalized that any research assignment and its conclusions are defined and judged by the particular combination of theoretical and proximal factors that shape them because they are founded on researchers' worldviews, human values, theories, and data gathering methods (Love, 2002). Love goes on to expand by saying that researchers as individuals, research processes and outcomes depend on researchers' subjective human cognitive-affective processes interacting with the assumptions that underpin their use of theories and data gathering methods and techniques.

The use of a correct methodology in a research project is essential. Ghoshi (2002) asserts that if a research follows the wrong method, the systematic knowledge or the truth cannot be ultimately found out. Ghoshi (2002:25) argues "that unless the right methodology is followed thoughts cannot be arranged in correct order".

There are two approaches to research, positivism and phenomenology, (Saunders, Lewis and Thornhill, 1997). These approaches are also known as quantitative and qualitative respectively.

The positivist paradigm argues that one should be able to explain phenomena in terms of what causes the behaviour we observe. The cause and effect underpins the positivist methodology. Positivism prefers 'working with an observable social reality and that the end product of such research can be law-like generalizations similar to those produced by the physical and natural scientists.' They further claim that the researcher is independent of and neither affects nor is affected by the subject of the research. The positivist approach assumes an external world determining behaviour, strives for explanation, prediction, and control by dividing into parts, and isolating them, mechanistic processes for explaining social behaviour, researcher is objective, and value-free, truth has to be confined to empirical evidence, it is deductive and normally uses quantitative data, (Saunders *et al* 1997).

On the other hand, phenomenology focuses on the social process and how individuals shape and give meaning to the social world. Understanding and interpreting these meanings underpins phenomenological methodology. On the other hand, phenomenology is a research approach where social reality is multiple, divergent and interrelated, analysis from the actor's own perspective, human behaviour is how people define their own world and reality is the meaning attributed to experience and is not the same for everyone.

As detailed above, positivism is manifested in the processes of proving or disproving hypotheses with quantitative measurement of variables. This research adopts the positivist approach because good research should enable a researcher to take more informed decisions about research design, be more than simply the methods by which data is collected and analyzed, educate the researcher on the different research traditions, enable one to adopt a research design to cater for the customers and assist in choosing the appropriate approach that will work for a given research, (Saunders *et. al,* 1997).

3.3 POPULATION

Albright (1987) defines a population as the set of all members about which a study intends to make inferences. Zikmund (1997) expands this definition by attributing some set of characteristics to the set of members. However, Wegner (1993) defines a population as all possible observations of the random variable under study. It is upon the population that the results of the study will be generalized (Fraenkel and Wallen, 1996). The population can be in two categories, the target and the study populations (Fraenkel and Wallen, 1996). The target population is the actual population to which the researcher would really like to generalise. However, this population is rarely available. Therefore, the population to which the researcher is able to generalise is the study population, (Fraenkel and Wallen, 1996).

In this study, the target population includes all companies in the manufacturing sector of the country. Labovitz and Hagedorn (1976) emphasise that defining the population is important because it helps the researcher in selecting a sample for study.

3.4 SAMPLING

McPhail (2001) defines sampling as a process of selecting a few (a sample) from a bigger group (the sampling population) to become the basis for estimating or predicting a fact, situation or outcome regarding a bigger group. As Saunders *et al* (1997) puts it, whatever one's research questions or objectives are , there will arise a need to collect data to answer the questions or objectives. It is often impractical for a researcher to survey the entire population hence the need for samples. Wegner (1993) and Ferber (1974) seem to agree when they define a sample variously as the part of a population taken into consideration under statistical inquiry. Saunders *et al* (1997) citing Moser and Kalton (1986) and Henry (1990) argue that using sampling enables a higher overall accuracy than does a census. However, to yield quality data, the sample must be representative of the population, and must permit accurate collection of data and all population units should stand a fair chance of being included. Supporting this view Zikmund (1997) points out that properly selected samples are sufficiently accurate in most cases.

Sampling techniques can be narrowed down to two broad types, namely probability and non-probability sampling. Employing random (probability) sampling ensures that the probability of each case being selected from the population is known and is usually equal for all cases (Saunders *et. al,* 1997). Whilst agreeing with Saunders *et al*, McPhail (2001:8.7) defines probability sampling as "a sampling in which the probability of each element in the population being selected is known and can be specified, and each element has a chance of being selected". On the other hand, non-random (non-probability) sampling is such that the probability of each case being selected from the total population is unknown and cannot answer questions that require statistical inferences about the population's characteristics. Citing Zikmund (2000), McPhail (2001) describes non-

probability sampling as a technique in which the sample units are selected on the basis of judgement or convenience.

Luck and Rubin (1987) contend that through non-random sampling, the assessment of reliability is not possible regardless of how careful the researcher is in selecting elements of the sample. Leedy (1992) also agrees that there is no guarantee that the samples represent the population being studied.

3.4.1 NON-PROBABILITY (RANDOM) SAMPLING

Wegner (1993) defines non-probability sampling as any sampling method in which the observations are not selected randomly. In this case, criteria other than randomness are the basis for selecting observations from the population. Below are non-random sampling methods:

Quota Sampling: Saunders *et al* (1997) equate quota sampling as a type of stratified sample in which selection of cases within strata is entirely non-random. Ideally the population is divided into segments and a quota of observations is collected from each segment (Wegner, 1993). Its major disadvantage is the unrepresentative nature of the sample drawn with respect to the population from which it is drawn. However, non-probability samples can be useful in exploratory research to obtain initial impressions of the characteristics of a random variable under study.

Judgemental Sampling

Judgemental sampling enables the researcher to use their judgement to select cases which will best enable the researcher to provide answers to research questions, (Saunders *et al*, 1997). The researcher attempts to draw a representative sample of the population by using personal judgement. Keogh (1999) contends that the amount of error depends upon the degree of expertise of the person making the selection. In this method, judgement is used by the researcher to select the best sampling units to include in the sample. If properly executed, it enables small samples to be representative, while the

researcher has the final say on selection. The method is however fraught with bias as the selection is unscientific and inaccurate.

Convenience Sampling

This involves selecting those cases, which are easiest to obtain for one's sample, (Saunders *et al*, 1997). The sample is drawn for the convenience of the researcher and is not representative of the population (Leedy, 1992). In this method, the researcher selects items on the basis of convenience. This normally applies where the population is not well defined, sampling unit is not clear, and a complete source list is not available.

3.4.2 PROBABILITY (RANDOM) SAMPLING

Probability sampling includes all selection methods where the observations to be included in a sample have been selected on a purely random (chance) basis from the population, (Wegner, 1993). It is only through the random selection of sampling units from the population to be included in a sample that sampling errors can be measured and, is able to establish the representative nature of the sample drawn. The random selection methods are discussed below:

Simple Random Sampling

This method ensures that each item in the entire population has an equal chance of being included in the sample, (Wegner, 1993). Ghoshi (2002) echoes this when he describes simple random sampling as a method where the units are selected from the population in such a manner as to afford every unit of the population the same chance of being selected. This method is used when it is assumed that the population is relatively homogeneous with respect to the random variable under study.

Systematic Sampling

Using systematic sampling, elements are selected from the population at a uniform interval that is measured in time, order or space. A random process selects an initial starting point, and then every *n*th number or unit is selected, (Zikmund, 1997). This

method differs from simple random sampling in that each element does not have an equal chance of being selected, thus some randomness is sacrificed.

Stratified Sampling

In stratified sampling a sub-sample is drawn using a simple random sample within each stratum, (Zikmund, 1997). Wegner (1993) states that stratified sampling divide the population into segments or strata. At the time of constructing the strata one should ensure that there is perfect homogeneity in the different units of strata, (Ghoshi, 2002). Stratification therefore should be clear, well defined and free from overlapping. Stratification can be worthless unless the population can be classified into strata that are homogenous in the state being investigated. In addition, when the sizes of different strata are unequal, attainment of correct proportions become very difficult.

Cluster Sampling

Zikmund (1997) states that the purpose of cluster sampling is to sample economically while retaining the characteristics of a probability sample. The population is divided into clusters, where each cluster is similar in profile to every other cluster. Clusters are then randomly selected for sampling. The sampling units within these randomly selected clusters may then be randomly selected to provide a representative sample from the population. According to Keogh (1999), cluster sampling tends to be used when the population is large and spread out over a geographical area. In such cases, smaller regions or clusters can more easily be sampled.

3.5 SAMPLE SELECTION

Table 3.1: Sample sizes for different sizes of population at a 95% level of certainty (assuming data are collected from all cases in the sample)

Margin of Error

Population	5%	3%	2%	1%
50	44	48	49	50
100	79	91	96	99
150	108	132	141	148
200	132	168	185	196
250	151	203	226	244
300	168	234	267	291
400	196	291	434	384
500	217	340	414	475
750	254	440	571	696
1000	278	516	706	906
2000	322	696	1091	1655
5000	357	879	1622	3288
10000	370	964	1936	4899
100000	383	1056	2345	8762
1000000	384	1066	2395	9513
10000000	384	1067	2400	9595

Source: Saunders *et al* (1997: 129)

Using the above table 3.1 as a pointer, questionnaires were randomly administered to 24 manufacturing companies listed on the Zimbabwe Stock Exchange (ZSE) using the simple random sampling technique. Three questionnaires were administered to each organisation to give a total of 72 questionnaires. Within an organisation, the researcher used a convenient sampling technique. This was used to make the process of data collection easier since the researcher administered questionnaires to those who were readily available.

The simple random technique was adopted in this study because it ensures that all the organisations have an equal chance of being included in the sample and the results of the study will be expected to be representative of the target population.

In most populations in research there exists very little similarity among elements and the situation dictates that a subset (sample) of the population be used to estimate the overall responses of a population, (McPhail, 2001). It is seldom possible to gather all the data on a random variable under study for analysis purposes. The sample findings will be used to deduce the likely overall behaviour of a random variable under study, (Wegner, 1993).

Whilst Ghoshi (2002) contends that proper selection of a sample is a very difficult task, Zikmund (1997) on the other hand acknowledges that advance knowledge of population characteristics, such as availability of lists of population members, is an important criterion.

The size of a sample is governed by a number of factors and Saunders *et al* (1997) list the following:

- The confidence one has in their data, which is the level of certainty that the characteristics of the data collected will represent the characteristics of the total population.
- The margin of error that the researcher can tolerate, that is, the accuracy one requires for any estimate made from a sample.

- The types of analysis one will undertake, in particular the number of categories into which one wishes to subdivide their data, as many statistical techniques have minimum threshold of data cases for each cell.

The above presents competing influences and Saunders *et al* (1997) conclude that it is not surprising that the final sample size is most certainly a matter of judgement rather than calculation.

The response rate of elements or subjects is quite critical when establishing the sample size and one has to estimate the response rate first, (Saunders *et al*, 1997). Saunders *et al* (1997) admit that estimating the response rate from the sample to which one is sending a questionnaire is difficult. They provide that one way of establishing the response rate is through the review of previous surveys. Saunders *et al* (1997) citing a research by Dillman (1978) give a benchmark for response rate of questionnaire at between 50 and 92 percent.

Saunders *et al* (1997) write that a researcher normally works to a 95 percent level of certainty. Table 3.1 above extracted from Saunders *et al* (1997) provides a rough guide to the different sample sizes required from different sizes of population at the 95 percent level of certainty.

3.6 DEVELOPMENT OF RESEARCH INSTRUMENTS

Validity, reliability and objectivity are the benchmarks on which research instruments are measured. Labovitz and Hagedorn, (1976) define validity as the ability of an instrument to measure what it is supposed to measure. However, Fraenkel and Wallen (1996) view this definition as old fashioned and instead, they argue that a more accurate definition of validity revolves around the "defensibility of the inferences researchers make from the data collected through the use of an instrument". They argue that validity of the instruments must always be considered within the context inferences the researcher makes regarding particular areas or topics. In other words, the researcher needed

instruments that would permit him or her to validate conclusions about the characteristics (perceptions, attitudes, and so on) of the individuals under study. The second consideration was reliability. A reliable instrument is one that gives consistent results (Babbie, 1973). The consistency gives the researcher confidence that the results actually represent what he/she intended to study. Reliable instruments obtain similar responses when administered to different respondents.

Fraenkel and Wallen (1996), claim that the issue of objectivity refers to the absence of subjective judgments. It is important in research to try to eliminate subjectivity from the judgments made concerning the subjects under study. Unfortunately, objectivity is never probably attained completely. In addressing these key issues about research instruments, the questionnaires were pre-tested before administering them at full to the sample. The aim of doing this was (Fowler, 1984) to reveal the ambiguities, poor worded questions, unclear choices and also to indicate whether the instructions to the respondents were clear. In the pre-test, the questionnaire was administered to five respondents from starafricacorporation, Zimbabwe.

According to Fowler (1984), attention should be paid to the length and clarity of the questions when preparing research instruments. Both close-ended and open-ended questions were used in the questionnaire. The close-ended questions allowed the research to cover a wide range of areas regarding organisational culture. Respondents prefer close-ended questions to open-ended questions since they are simple to answer, (Fraenkel and Wallen, 1996). However, close-ended questions have limited breath of responses, are harder to construct and require more questions to cover the research topic than the open-ended type, (Babbie, 1973).

Open-ended questions were included to allow respondents to express their views independently. The advantages of these questions were that they allowed more freedom of response, were easier to construct and permitted follow-up by the interviewer. However, the disadvantages were that the responses tended to be inconsistent in length and content across respondents, which made them susceptible to misinterpretation and

were more difficult to process, (Fowler, 1984). Validity was the key issue and that was the reason the pre-testing of the instruments was conducted.

3. 7 DATA COLLECTION

The researcher used structured questionnaires, the most widely used survey data collection technique (Saunders *et al*, 1997). This method was used in order to capture the desired information and consequently, to produce quality results.

3.7.1 Questionnaires

The questionnaire was used as a data collection instrument because of its applicability to the survey research design (Labovitz and Hagedorn, 1976). Babbie, (1973) claims that the major advantage of using the questionnaire is that it can be administered to large numbers of people at the same time. This method also proved to be cost effective and convenient in collecting data. The disadvantages of the questionnaire is that it has a very low response rate since people have an anti-questionnaire phobia and more often than not, the researcher will not be available to provide clarity in those areas that will not be clear to respondents. The other disadvantage is that it is harder to produce a good questionnaire that will collect the precise data the researcher desires to answer research questions and objectives.

3.7.2 Interviews

Saunders *et al* (1997) citing Kahn and Cannell (1957) describe an interview as a purposeful discussion between two or more people. Interviews are meant to elicit primary data responses through direct questioning, (Wegner, 1993). It is the most common form of data collection in the field of marketing and market research. According to Fraenkel and Wallen (1996), the advantages of using the interview technique approach are that the respondents can expand on areas of interest and uses non-verbal cues such as facial expression to emphasise their responses. However, Fraenkel and Wallen (1996) are

worried about the time taken to conduct an interview. In this study, no interviews were conducted.

3.7.2.1 Personal Interviews

An interview is called personal when the interviewer asks the questions face-to-face with the interviewee (Keogh, 1999). Personal interviews can take place in the home, at a shopping mall, on the street, outside a movie theater and so on. According to Cook, Thomas and Campbell (1979), the advantages of personal interviews are the ability to let the interviewee see, feel and/or taste a product, the ability to find the target population, and longer interviews are sometimes tolerated.

Personal interviews often yield subjective information, which may or may not be true and the more personal the more delicate things may not be disclosed by this method, (Ghoshi, 2002). However, the disadvantage of personal interviews is that they usually cost more per interview than other methods (Duncan and Duncan, 1994).

3.7.2.2 Telephone Surveys

Studies have shown that telephone interviews have become the primary method of survey research (Zikmund, 1997). Supporting this Irwin (1999) reports that surveying by telephone is the most popular interviewing method in the USA. This is made possible by nearly universal coverage (96% of homes have a telephone).

The quality of the data collected can be compared to the data gathered through personal interviews (Zikmund, 1997). The advantages of telephone surveys are that (Irwin, 1999) people can usually be contacted faster over the telephone than with other methods, random telephone numbers can be dialed when there are no actual telephone numbers of potential respondents and skilled interviewers can often elicit longer or more complete answers than people will give on their own to mail or email surveys.

However, according to Duncan and Duncan (1994), the disadvantages of telephone surveys are:

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- Many people are reluctant to participate in phone interviews and use their answering machines to screen calls.
- With the growing number of working women, this often means that no one is home during the day. This limits calling time to a "window" of about 6p.m to 9 p.m. (when researcher or interviewer can be sure to interrupt dinner or a favorite TV program).
- One cannot show or sample products by phone.

3.7.2.3 Mail Surveys

This is a self-administered questionnaire sent to respondents through the mail, (Zikmund, 1997). With this method, the researcher sends a questionnaire to the interviewee by mail and encloses a return envelope, (Pedhazur and Schmelkin 1991). Using the return envelope, the interviewee sends back the completed questionnaire after a reasonable time interval. It is suitable when the target population from which primary data is required is large.

Mail surveys have the following advantages (Wegner, 1993): they are among the least expensive, this is the only kind of survey one can do if the names and addresses of the target population are available, but not their telephone numbers. The questionnaire can include pictures, something that is not possible over the phone. Mail surveys allow the respondent to answer at their leisure, rather than at the often inconvenient moment they are contacted for a phone or personal interview. Zikmund (1997) argues that mail questionnaires are able to reach a geographically dispersed sample simultaneously and at a relatively low cost.

A myriad of disadvantages of mail surveys are (Shadish, Cook, and Campbell, 2002) that the responses take a longer time and in populations of lower educational and literacy levels, response rates to mail surveys are often too small to be useful.

3.7.2.4 Computer Direct Interviews

This requires that the interviewees enter their own answers directly into a computer, (Duncan and Duncan, 1994). They can be used at malls, trade shows, offices, and so on.

This method has the following advantages (Wegner, 1993): data entry and editing costs are virtually eliminated, they give more accurate answers to sensitive questions, they eliminate interviewer bias and, response rates are usually higher.

The disadvantages of computer direct interviews are (Irwin, 1999) that interviewees must have access to a computer or one must be provided for and as with mail surveys, computer direct interviews may have serious response rate problems in populations of lower educational and literacy levels.

3.7.2.5 Email Surveys

With the advent of the internet and email, soft copies of a questionnaire are sent to a sample of respondents, (Wegner, 1993). The reasons for conducting the research are explained to participants and what is hoped to be achieved. Confidentiality of the information is assured and a deadline for the return of the questionnaire is given.

The advantages of email surveys are (Pedhazur and Schmelkin, 1991) that they are both very economical and very fast. More people have email than have full internet access, an email questionnaire can gather several thousand responses quickly and, there is practically no cost involved once the set up has been completed.

However, email survey has the following disadvantages (Irwin, 1999):

- One must possess (or purchase) a list of email addresses.
- Some people will respond several times or pass questionnaires along to friends to answer.

- One cannot use email surveys to generalize findings to the whole population. People who have email are different from those who do not, even when matched on demographic characteristics, such as age and gender.
- Email surveys cannot automatically skip questions or use other automatic techniques that can enhance surveys the way web page surveys can.

3.8 TYPES OF DATA

3.8.1 Primary data

Zikmund (1997) states that primary data are gathered and assembled for the particular research project available. This is supported by Parasuraman (1991), who agrees that primary data is collected specifically for a project. Primary data is expensive to collect, but it is important, as it is possible to formulate structured and unstructured questions that focus on the study topic. This study relied mainly on the data collected through questionnaires as its primary source of information. This constitutes the most important form of data collection given the qualitative nature of the research topic, (Merriam, 1998). The information is crucial to the research project as it specifically addresses issues of interest to the study area.

3.8.2 Secondary data

Secondary data is mostly historical data. It is data that will have been collected and assembled for some other project, (Zikmund, 1997). Secondary data are data gathered and recorded by someone else prior to (and for purpose other than) the current project. Secondary data is cheaper to collect as opposed to primary data. It is usually gathered from various sources such as websites, various textbooks, journals and company documents like business plans, divisional plans, and annual reports and so on. Secondary data has been referred to in this study.

3.9 DATA PROCESSING, ANALYSIS AND PRESENTATION

Once the fieldwork has been completed, the data must be converted into a format that will answer the decision maker's questions, (Zikmund, 1997). Data processing usually consists of questionnaire coding, data entry and data cleaning. Initially, the questionnaires were given unique codes for all responses. Data entry was done using Microsoft Excel. After entry, the data was cleaned to remove inconsistent responses. The data was also analysed using Microsoft Excel. In data analysis and interpretation, frequencies, percentages and mean were used. The information is presented using tables, graphs, charts and testing of hypotheses to enable easy comparison and clear projection of the situation. These findings are laid out in chapter four, together with their detailed discussion.

3.10 LIMITATIONS OF THE STUDY

This research study has the following limitations.

1. The study may not be representative of all organisations in the manufacturing sector of the country, as only those in Harare were surveyed.
2. The study was also limited by financial and time constraints.

3.11 CHAPTER CONCLUSION

The chapter explored how research instruments were developed, methods of data collection, data entry, data processing and analysis. The researcher went on to discuss the research design used in the study and the reasons for choosing the design. The next chapter will present the research findings and discussions.

CHAPTER 4

4.0 RESEARCH FINDINGS AND DISCUSSIONS

4.1 INTRODUCTION

The chapter is going to present the findings and discussion found in the research. The chapter provides the basis on which conclusions and recommendations of the study are made.

4.2 RESPONSE RATE

Three questionnaires were administered to each of the 24 manufacturing companies listed on the Zimbabwe Stock Exchange to give a total of 72 questionnaires. Fifty-three were successfully completed and returned for analysis, representing a response rate of 74%. This response rate is high enough to warrant validity and reliability of the research findings.

4.3 GENERAL INFORMATION

4.3.1 Positions held in the organisation

The positions held by respondents in the manufacturing companies are shown in figure 4.1 below.

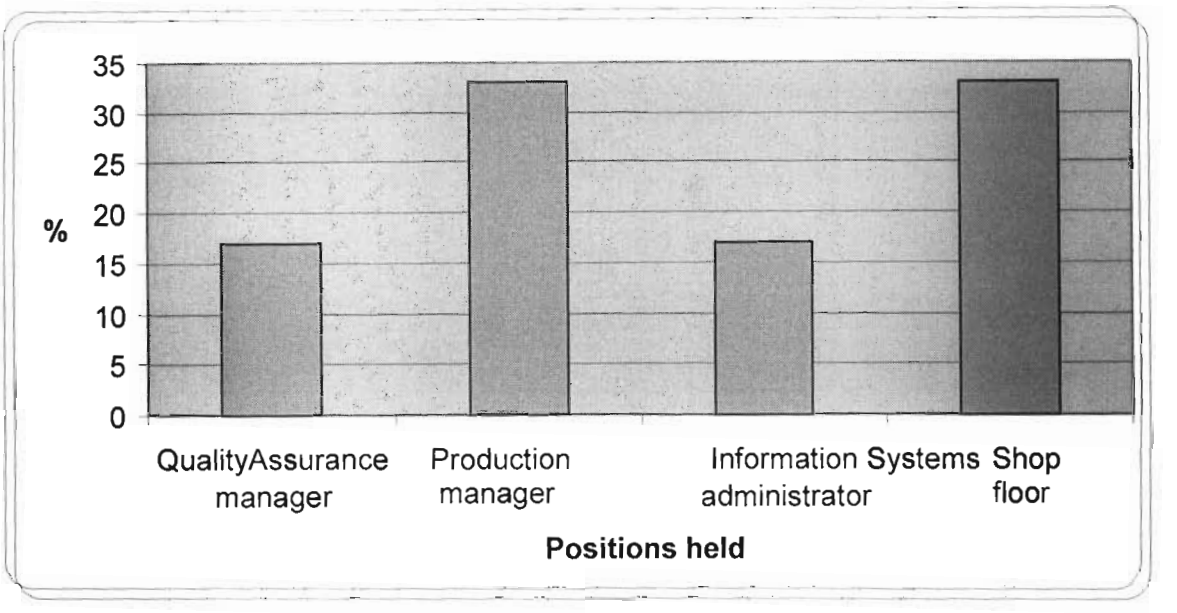

Figure 4.1: Positions held by respondents

The results indicate that 17% of the respondents are quality assurance managers, 33% are production managers, and 17% are administrators, while 33% are shop floor workers. This shows that the research targeted both management and general staff. However, the majority of the respondents were in management. This is particularly so as they make decisions on operations.

4.3.2. Performance of organisations in the past five years.

Figure 4.2 below shows the responses on the performance of manufacturing companies in the past five years

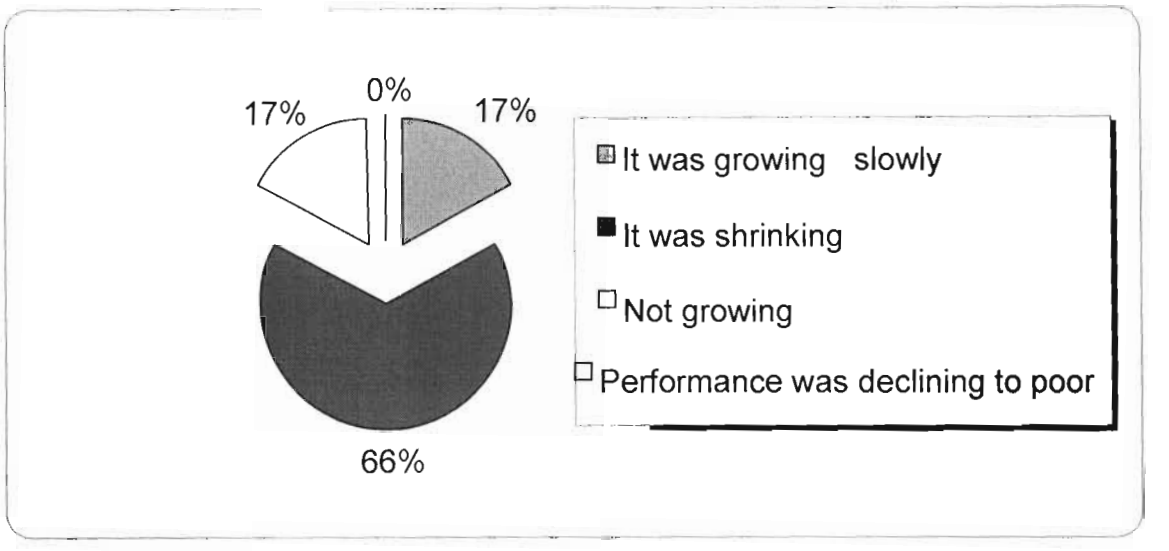

Figure 4.2: Performance of manufacturing companies in the past five years

The general view as highlighted by 66% of the respondents that the manufacturing sector is shrinking is supported by trends in figure 2.1 and statistics in Tables 2.1 and 2.4.

4.4 OPERATIONS

4.4.1 Operations systems in use by companies in the manufacturing sector

Respondents were asked to mention the operations systems that they are using in their organisations. The results are shown in figure 4.3 below.

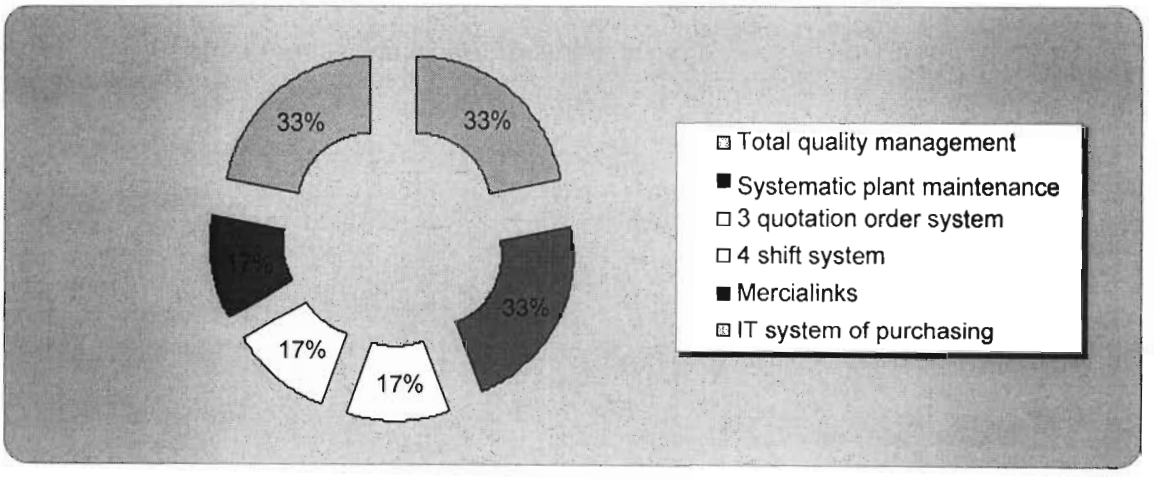

Figure 4.3: Operations systems that are being used in the manufacturing industry

Companies are applying various operations techniques in the day to day running of their businesses. Greater weight is seen in the application of TQM and scheduled plant maintenance. TQM is seen as a comprehensive package which aims at achieving excellence in the whole business, hence the reason a significant number of companies are embarking on it. Of equal importance is the need to ensure that the plant runs with minimum disruptions, which can only be achieved by focusing on the maintenance aspect.

4.4.2 Effectiveness of the operations systems

Respondents were asked how effective their current systems are

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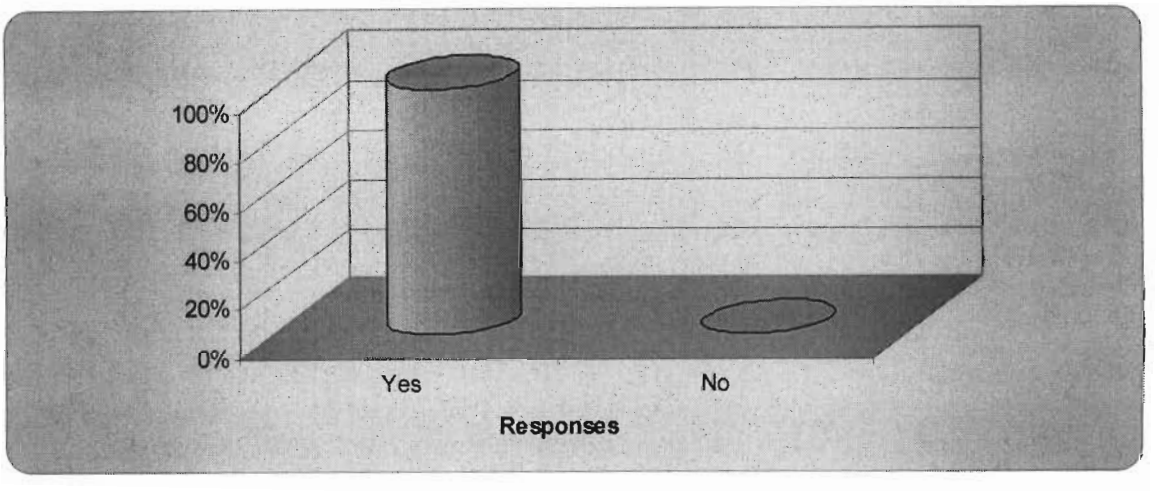

4.4: Effectiveness of the operations systems

All respondents highlighted that they have been monitoring and continuously reviewing systems to suit the current operating environment. There are also measurement techniques in place that can detect whether the systems are still productive and reliable. Respondents were confident that the methods being applied are flexible enough to respond to changing supply and demand situations.

The analysis below investigates the degree of flexibility of the operations systems to the current economic environment.

4.4.3 Flexibility of the operations systems to the current environment.

Figure 4.5 below shows the responses on whether the operations systems that are used by companies in the manufacturing sector are flexible.

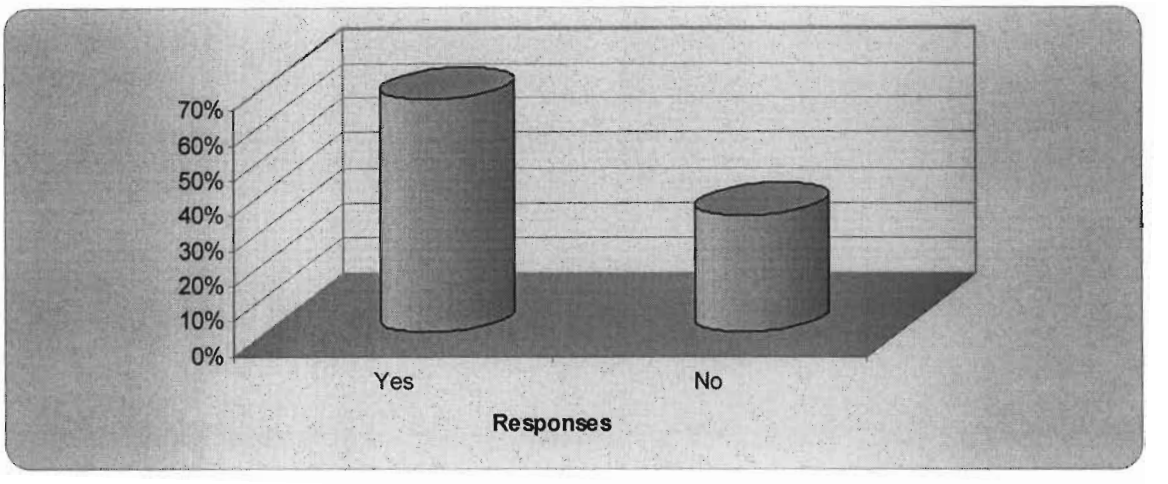

Figure 4.5: Flexibility of the operations systems in the current environment in Zimbabwe

The findings show that 66% of the respondents believe their systems can be modified or completely overhauled to accommodate changes in the operating environment.

4.4.4 Existence of research and development departments.

Figure 4.6 shows the existence of research and development department in companies

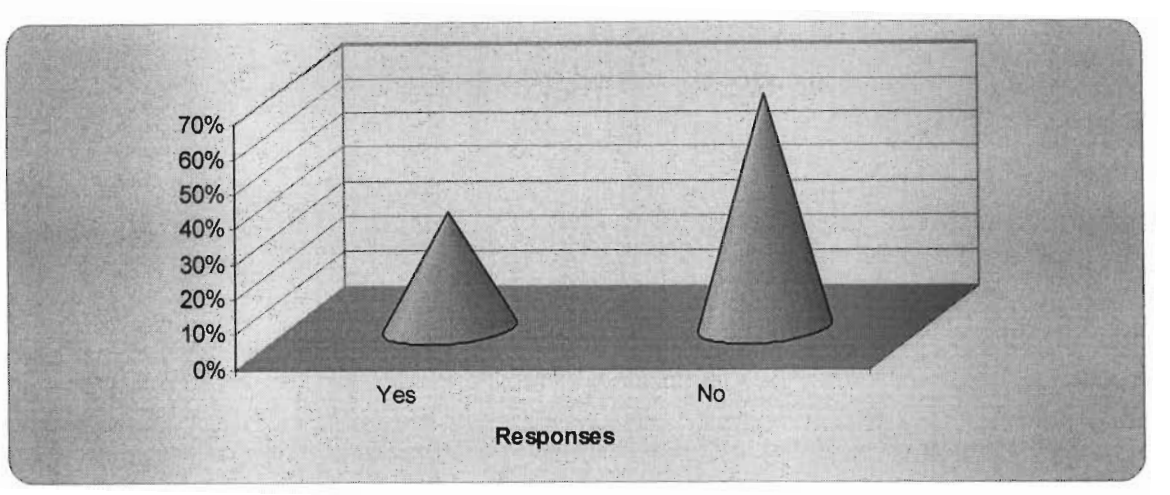

Figure 4.6: Existence of research and development department

The research findings indicate that 66% of the respondents held that companies they work for do not have research and development departments while 33% held that they have. However, research and development is becoming very expensive. Analysis of technology will need to examine both the life cycle of the organisation's major products and, at a more fundamental level, the technological resources available to the company. 33% of the respondents who indicated that they have research and development departments explained how the research and development has contributed to the improvements in the current design of production process. The results are illustrated in table 4.1 below.

Table 4.1: Contributions of R&D to improvements in the current design of production process systems

Contributions of R&D to improvements in the current design of production process systems	**% response**
Preventing wasting utilities	20%
Improving quality standards by ISO certification	20%
Timeous innovations	20%

The results highlight that 20% of the respondents held that R&D identified areas that could generate potential savings. These included prevention of waste, promoting ISO certification, which is an international quality driven standard, emphasizing on producing quality products cost effectively and finally R & D identified innovations that could be applied to improve on the current process systems. Ho and Fung (1998) argued that TQM is the art of managing the whole to achieve excellence (timeously production, reducing wastages and improving quality standards). It is both a set of guiding principles and philosophy that make up the basis of a continuously improving organization. It seeks, through quantitative methods and human resources to improve all the processes within an organisation and exceed customer needs now and in the future.

4.4.5 Possibility of changing plant design to accommodate new strategies.

An investigation to find out the possibility of changing the plant design to accommodate new strategies was carried out. Figure 4.7 shows the results.

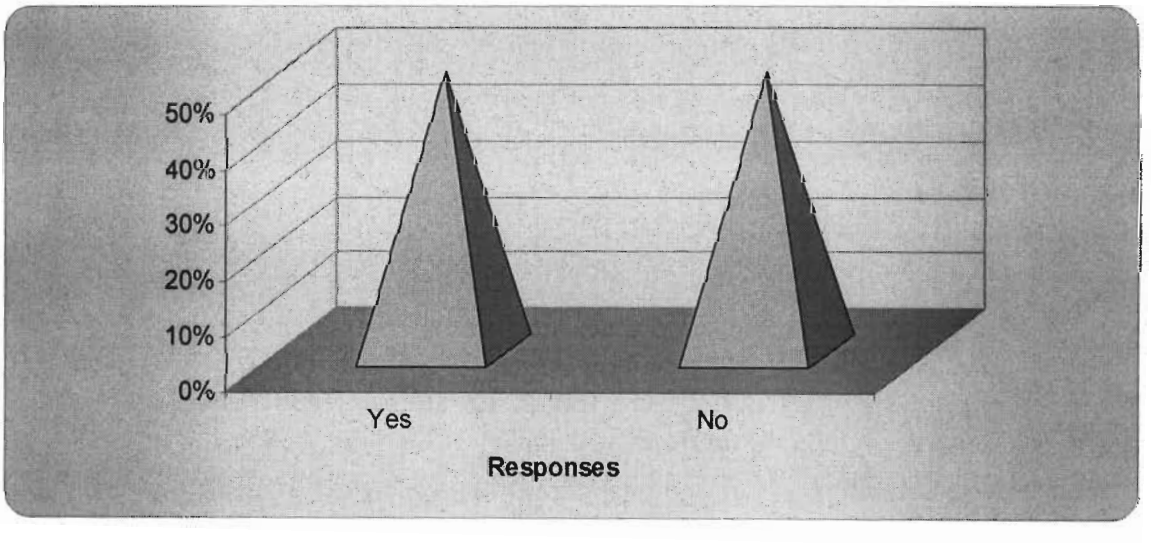

Figure 4.7: Flexibility of changing plant design to accommodate new strategies

Figure 4.7 indicates that 50% of the respondents held that it is possible to change the plant design to accommodate new strategies, while the other 50% held that their plants can not be changed. The latter was common from companies that are involved in mass production whose processes are capital intensive.

4.4.6 Benefits from plant modifications

Table 4.2 below shows the benefits derived from plant modifications.

Table 4.2: Benefits derived from plant modifications

Benefits from plant modifications	Response rate
Automation of online performance monitoring facilities	75%
Efficient capturing of operation costs for analysis to improve management decisions	40%
Reduction of waste on production floor	35%

Table 4.2 highlights that 75% of the respondents held that they automated their plants to achieve online monitoring of their production processes. For example some plants were installed with flow meters to measure the volumes from one process to the next while others installed temperature controllers to measure and control heat in the processes. The other 40% said that the plant modifications were done to be able to capture cost more efficiently. The 35% who have managed to reduce waste gave credit to the operations of research and development which managed to identify areas of wastages, hence modifications carried out to address the problem areas.

4.4.7: Use of Business Process Re-engineering (BPR) as a disaster recovery system

Figure 4.8 below shows responses on the use of BPR in manufacturing companies.

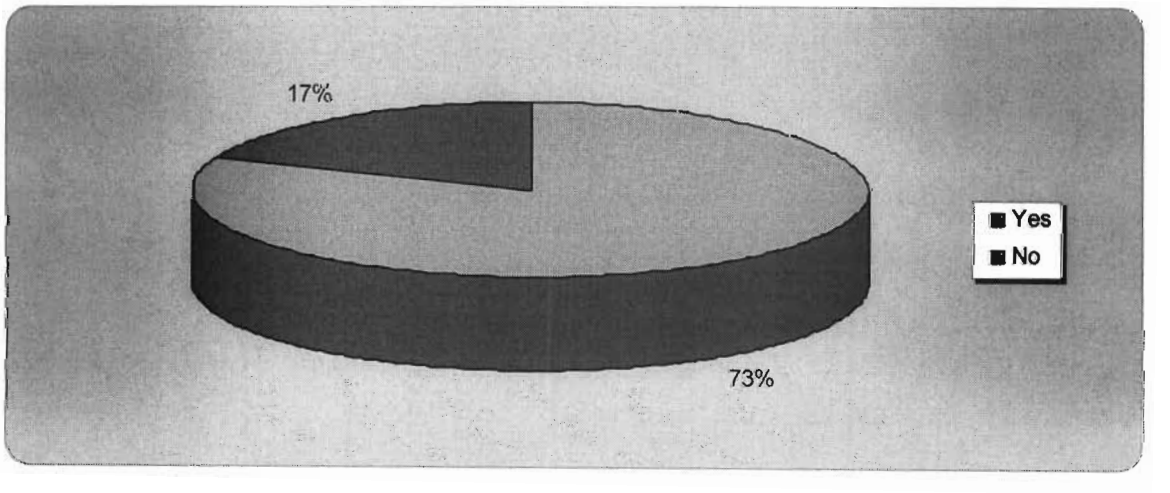

Figure 4.8: Use of BPR

The research findings reveal that 73% of the respondents held that they have used BPR as are recovery plan while 17% have not. This implies that the majority of the manufacturing companies is aware of the existence of BPR as an operations management technique and has applied it in an effort to improve profitability and counter the shocks that were introduced by the current economic and political situation.

4.4.8 Goals achieved by BPR

Respondents were asked to highlight the goals achieved by the use BPR in their organisations. The results are shown in table 4.3 below

Table 4.3: Goals achieved by the use of BPR

Goals	%response
Redesign of business process	14%
Improved quality of products	42%
Flexibility of operations	42%
Improved speed and service	42%
Increased volume of products	42%

The results imply that BPR is a comprehensive process that aims to bring about positive change in the way businesses should operate. Generally, what is important in the BPR process is gaining widespread support for change. If support of those who know how the business operates is gained, then they may contribute to lasting improvements in business processes. Many companies often foresee change poorly. They quickly go for downsizing, dismiss employees on a large scale, and give incentives for employees to resign voluntarily, paralyse survivors with fear and aversion to taking initiative. Getting rid of people whose skills have become obsolete reflects the organization's failure to innovate and learn. Process improvement continues for the lifetime of a company, with each major improvement bringing forth new payoff opportunities. (www.wikepedia.org)

Business Process Re-engineering is a typical breakthrough approach which involves a complete rethinking and redesigning of all cross functional processes to achieve a desired outcome. It is not a cheap approach to improving processes as it may involve huge capital expenditure where design may be altered.

4.4.9: Factors that are hindering manufacturing companies from meeting production targets.

An investigation to find out the factors that are hindering manufacturing companies from meeting production targets was carried out. The results are shown in the table below.

Table 4.4

Factors hindering manufacturing firms meeting production targets	% response
Shortage of raw materials	55%
Shortage of foreign currency	66%
Power cuts	11%
Water cuts	11%
Lack of innovation	44%
Difficult sourcing environment	44%
Slow management responses to the operation environment	11%
Poor quality materials	11%

Responses in Table 4.4 are generally pointing at external factors as the main reason for not being able to meet production targets.

4.4.10: Level of capacity utilisation of plants.

Figure 4.9 below indicates the level of capacity utilization of plants of companies in the manufacturing sector.

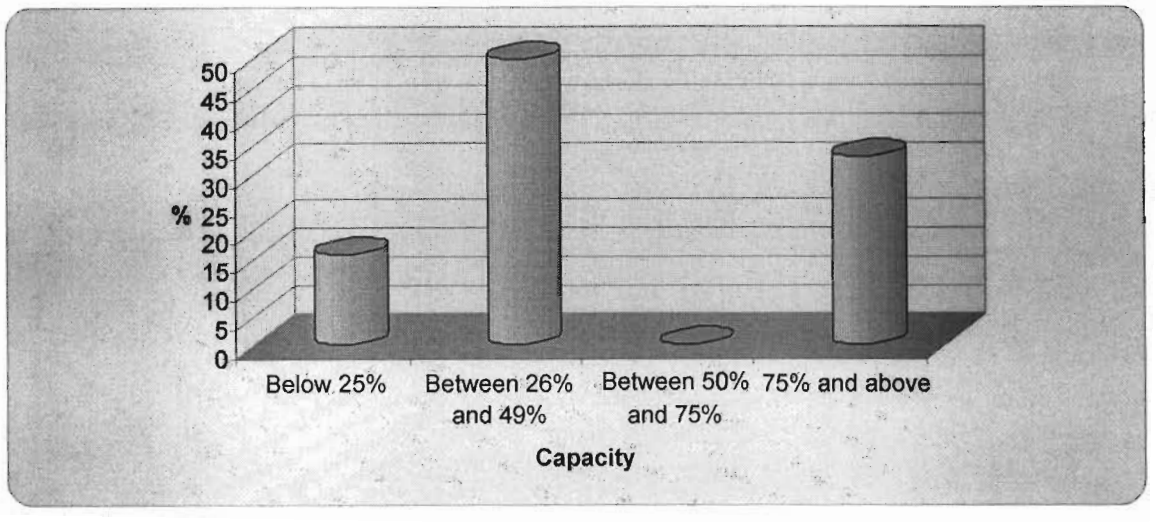

Figure 4.9: Level of capacity utilisation of manufacturing plants.

The results indicate a generally low capacity utilisation given that 66% of respondents cited capacity utilization of 49% and below. Most companies also highlighted that they are operating below their best operating levels, the level of capacity for which the process was designed and thus is the volume of output at which average unit cost is at a minimum. As a result this has increased the average cost of production as overhead is being absorbed by fewer units. Capacity utilisation rate is therefore used to reveal how close a firm is operating to its design capacity (www.pom.edu/p304/ch8ppt.htm).

4.4. 10: Level of meeting production targets

Respondents were asked to indicate how well they are meeting their production targets. The responses are demonstrated in figure 4.10 below

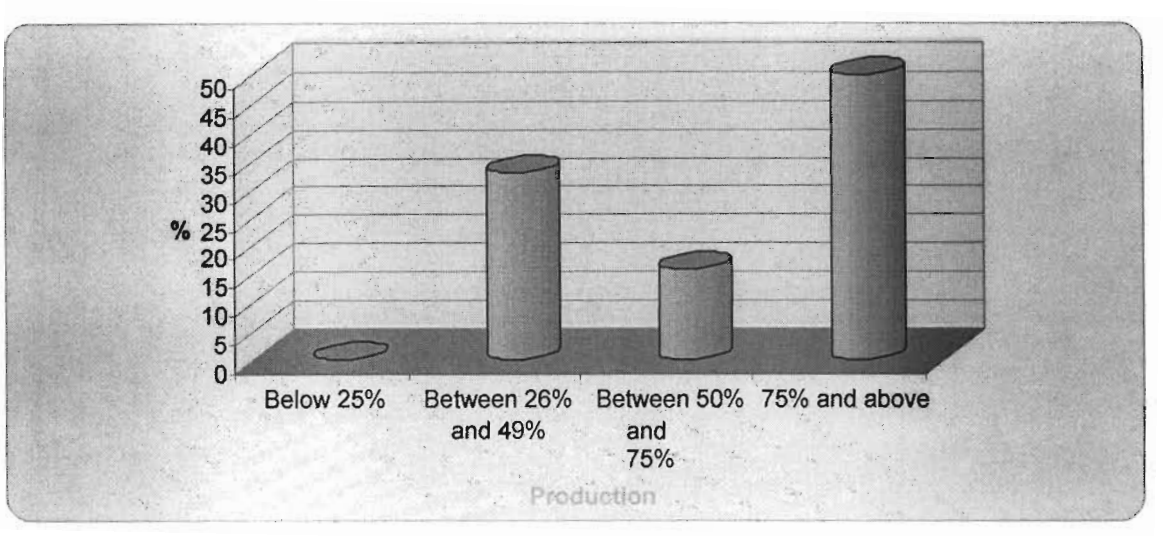

Figure 4.10: Level of meeting production targets.

The research findings show that 50% of the respondents held that they meet 75% and above of production targets, 33% held their production is between 26% and 49% of target, while 16% held that it is between 50% and 75%. However the research also revealed that most companies have had to revise their targets downwards in line with reduced capacity utilisation and the state of machinery as well as the inability to access raw materials and foreign currency. Most companies maintain information on production statistics and these usually take into account a number of variables under which the results were achieved. Usually this is driven by the effective capacity available. (Schiller, 2000)

4.4.11. Benchmarking

Figure 4.11 demonstrates the use of benchmarking in organisations

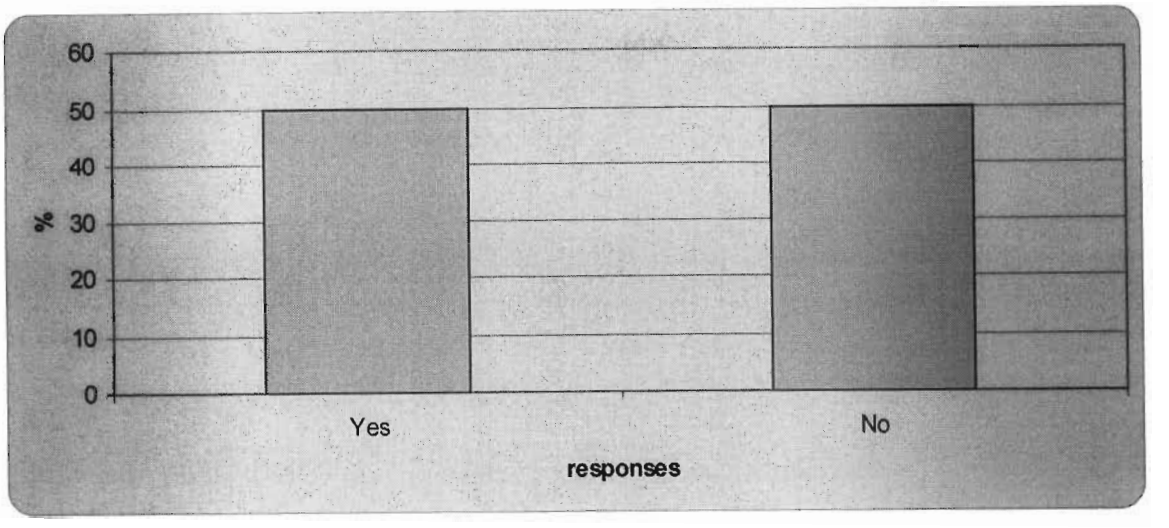

Figure 4.11 Use of Benchmarking

The findings show that 50% of the respondents held that they use benchmarking, while the other 50% held that do not. Respondents who use benchmarking held that their companies have been able to penetrate the external markets as their products have become competitive.

4.5 MACRO- ECONOMIC ENVIRONMENT

4.5.1 Operations strategies to sustain companies in the current macro-economic environment

Table 4.5 below shows the operations strategies in use by firms in the manufacturing sector.

Table 4.5: Operations Strategies

Operations strategies	% response
Outsourcing some products lines	43%
Entering into toll manufacturing	37%
Using three quotation purchasing system	41%
Focusing on high margin products	52%
Aligning human resources	23%
Exporting in order to get foreign currency to acquire inputs	57%

As the results indicate, companies in the manufacturing sector are applying various strategies in order to remain in business. 57% of respondents are exporting to earn foreign currency that assists in purchasing inputs and other spare parts. In order to improve on capacity utilisation, 37 % of respondents say they have gone into toll manufacturing. This is where a customer supplies their raw materials and the company processes the raw materials and returns to the customer as a finished product. The company charges a fee for processing but does not take ownership of the product. 43% have indicated that they have had to outsource production of some product lines mainly because some section of their plant might down due to shortage of spare parts but cannot afford to lose customers, hence the need to outsource. The 52 % focusing on high margin products cite this as a means to cushion their companies against the losses from some of their products that fall under price controls.

The research went on to find out the effectiveness of the operations strategies in use. The findings are shown below

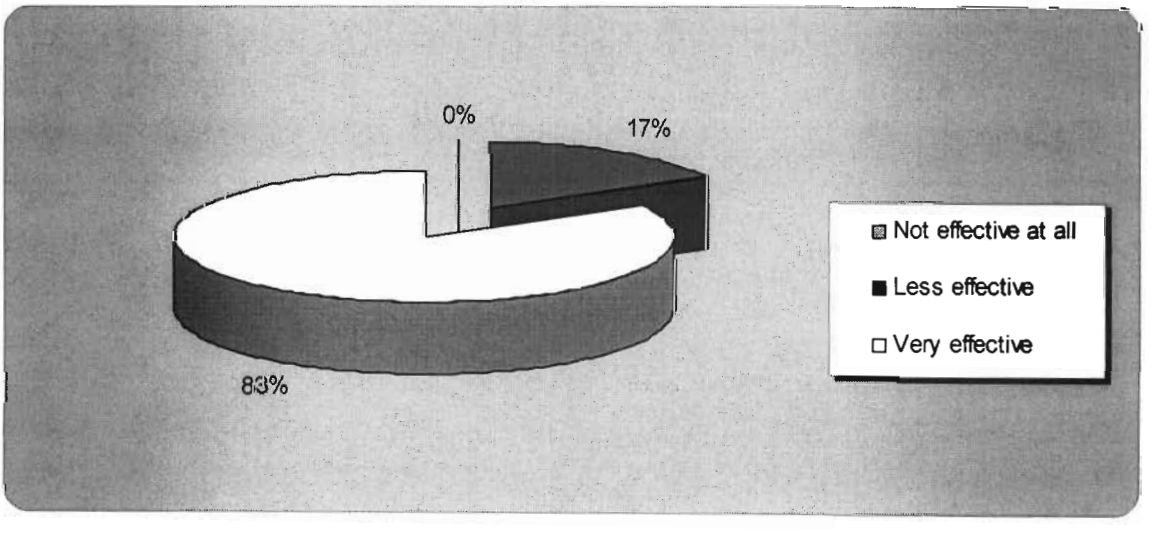

Figure 4.12: Effectiveness of the operations strategies.

Results reveal that 83% of the respondents believe that the operations strategies in use have sustained their businesses to date and therefore are confident that the strategies are effective, while 17% held that they are not as effective as they hoped they would be. 17% of the respondents who held that the operation strategies are less effective gave reasons

that there are no government policies that support efforts of the manufacturing industry. As read in the Togo case study, macro economic decisions and policies are also crucial in determining the direction of operations strategies. The impact of monetary and fiscal policies regarding issues like interest rates, the level of taxation, government expenditure and policies towards investment become key in making operations decisions. Fluctuations in exchange rates, statistics on economic growth, inflation, and unemployment levels influence the way operations are run, particularly in most third world countries.

4. 5.2 Exports

Figure 4.13 below shows the responses on whether manufacturers export some of their products or not.

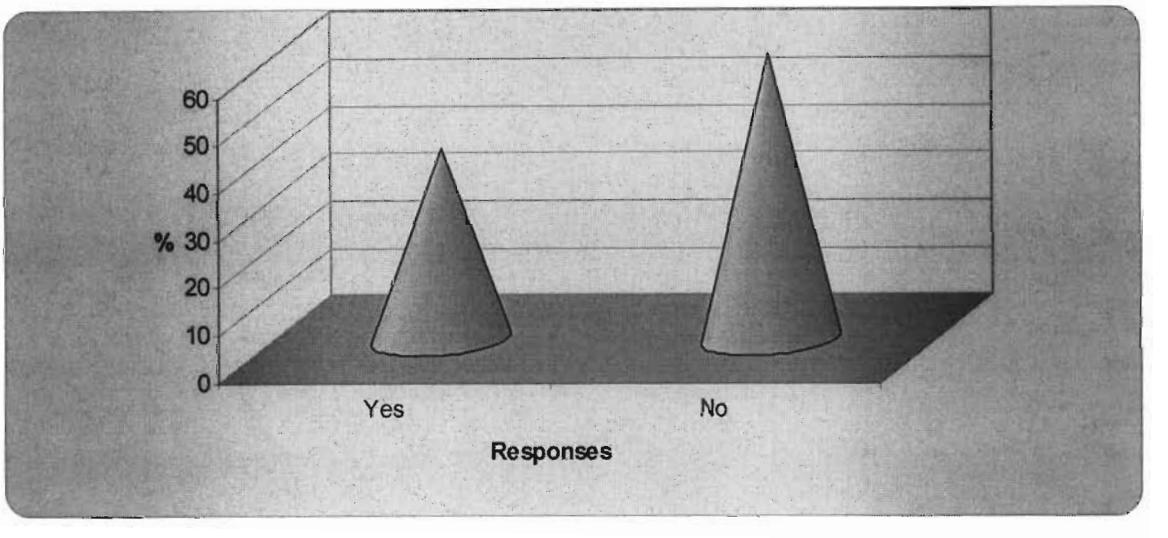

Figure 4.13: Exports

The findings reveal that 40% do export while 60% do not. Companies in Zimbabwe are no longer free to import and export their products due to lack of foreign currency to import spares. In addition exchange rates disparities play a significant role in demotivating exporters. These are caused by inputs acquired at the parallel market rates whilst export receipts are liquidated at the official rate which is normally fixed by the central bank. Similarly in Togo, the second half of the 1970s was also characterized by an increase in government control over the external trade sector and aggressive import

substitution policies. Through this move, the government controlled over 90% of export revenues.

4.5.3 Benefits derived from partnerships

Respondents described the benefits of having partnerships with foreign companies. The findings are indicated in figure 4.14 below

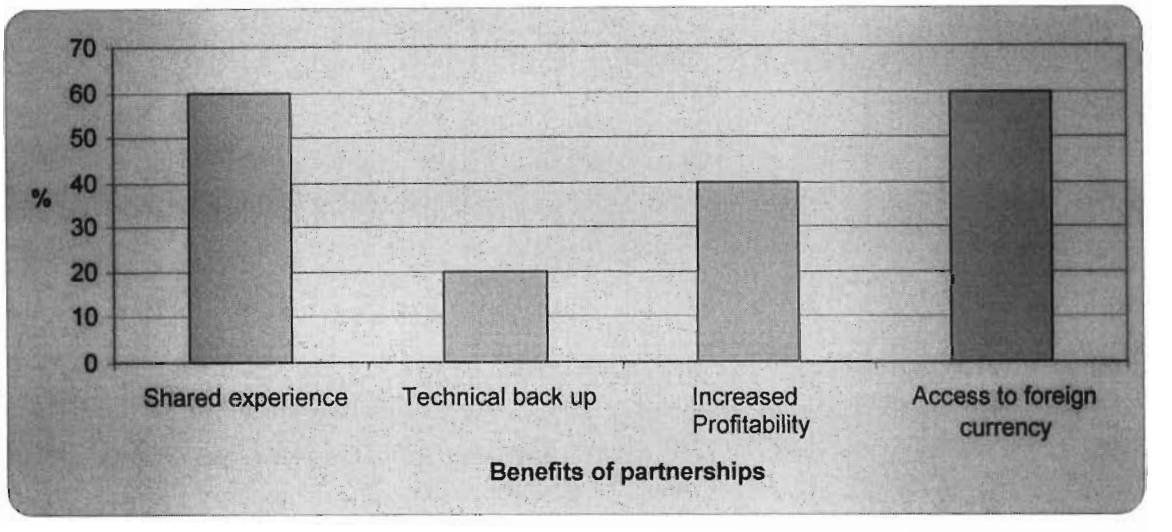

Figure 4.14: Benefits of partnerships with foreign companies

Research findings reveal that there is merit in forming partnerships with external companies. Apart from the shared experiences gained, this strategy seems to have addressed one of the biggest problems that the industry is facing, that of accessing foreign currency. Companies have used the foreign currency earned to procure raw materials and spares.

4.5.4 Difficulties in procuring raw materials

Figure 4.16 below shows the difficulties that are encountered in procuring raw materials.

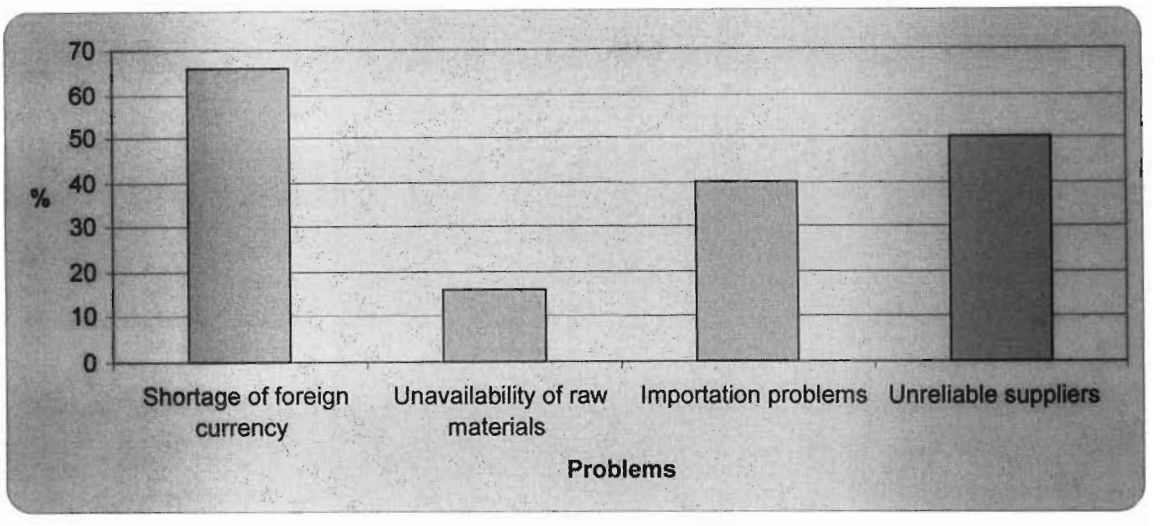

Figure 4.15: Difficulties encountered in procuring raw materials

Foreign currency shortage has been cited as the biggest challenge in trying to secure raw materials as reflected in Figure 4.15 by 66% of the respondents. In addition even after making payments in advance to external suppliers, deliveries have become increasingly unreliable. The situation has also been worsened by in some cases, prohibitive and bureaucratic import regulations by the Zimbabwe Revenue Authority.

4.5.5 Skills in the Operation Department

Figure 4.16 indicate whether respondents have adequate skills in the operations department.

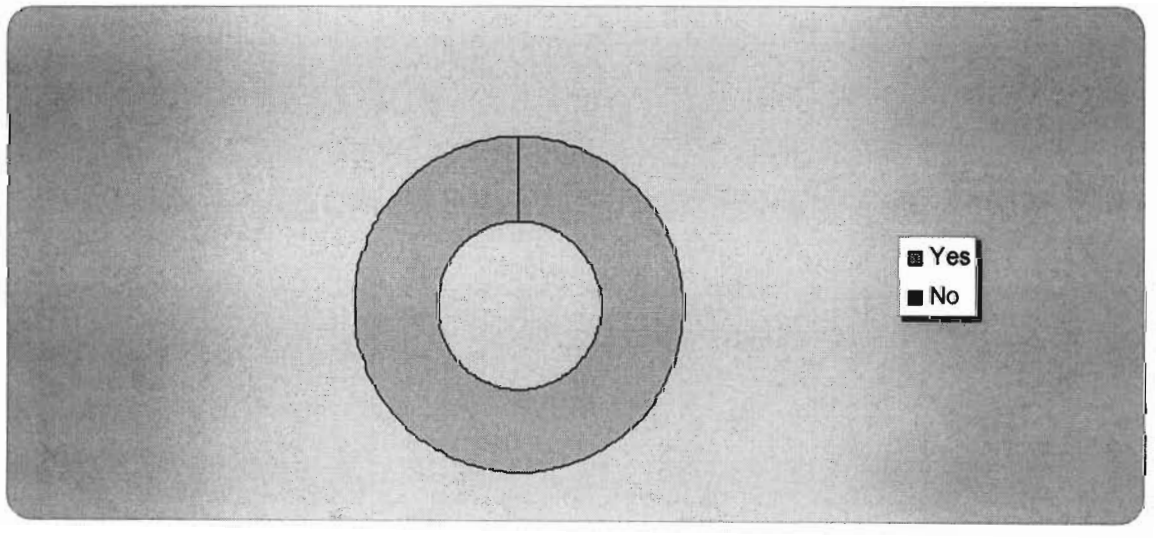

Figure 4.16: Skills

All respondents highlighted that they have adequate skills in the operations department which shows that manufacturing companies have managed to retain skills in the current environment.

4.5.6 Government initiatives to revive industry in the past five years

A research to find out, from the industry perspective, if there were any government initiatives in the past five years to revive the sector was carried out. The findings are shown in the figure below.

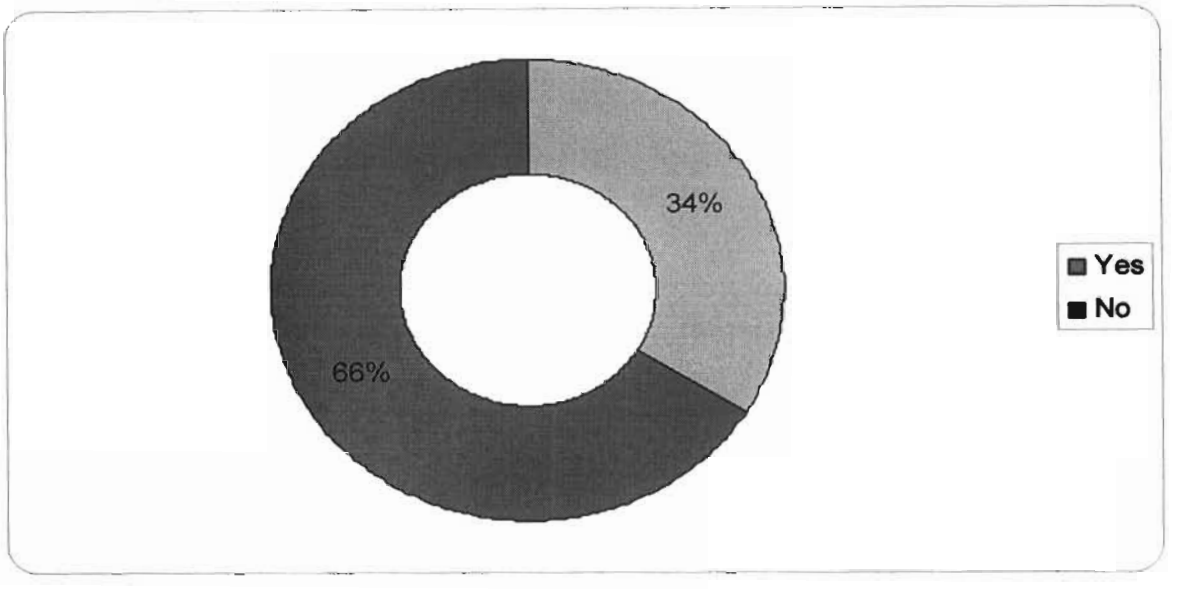

Figure 4.17: Government initiatives to revive manufacturing sector

Figure 4.17 above shows that 66% of the respondents held that the initiatives on paper are not implemented and some of them are not practical given the magnitude and nature of the problems facing industry. As a result such initiatives are as good as not being there. Further analysis revealed that initiatives are there but industry is not confident with their viability. The unfulfilled programs such as the MERP and National Revival Programme have led to industry lacking trust in any government led initiatives.

4.5.7 General comments regarding manufacturing sector in Zimbabwe.

Table 4.6 below highlights the comments/ recommendations presented by respondents on the current operational environment

Table 4.6: Recommendations

Comments regarding manufacturing sector in Zimbabwe	% response
Companies should enter into export markets in order to generate foreign currency	14%
Economic environment is not conducive for companies to operate	14%
Employees need to be trained	14%
Reduce overheads and minimize costs	14%
Every activity must have someone responsible	14%
Aggressive marketing strategies	14%
Align operation in line with changes in the economy	14%
Increase accountability in operations	14%

The findings show that respondents believe that all the recommendations should be applied if companies are to remain in business. The recommendations bring about positive results and therefore should be given equal weights and have to applied together at the same time.

4.6 CHAPTER CONCLUSION

The chapter has presented findings on the operations of manufacturing companies in Zimbabwe. These findings were discussed by linking with the literature reviewed by the study. The next chapter presents the major conclusions and recommendations of the study.

CHAPTER 5

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The chapter is going to present the conclusions and the recommendations that are given by the study. An area of further study is also suggested.

5.2 CONCLUSIONS

5.2.1 EFFECT OF THE MACRO-ENVIRONMENT ON OPERATIONS

Theory says that the performance of an industry is affected by the general conditions in the macro-environment. These conditions include the state of political, economic, social and technological environment in which companies operate. According to the findings of the research, all the economic fundamentals are moving against the economy. The research identified shortages of foreign currency, negative economic growth which has resulted in company closures and high rates of unemployment. These have created an environment that is not conducive for the manufacturing industry in Zimbabwe to operate efficiently.

Deteriorating Business Environment

As shown in Figure 2.1 the economy of Zimbabwe has been in a recession since 2000. The recession has greatly reduced the viability of business. It has been revealed in the survey that some of the companies in the manufacturing sector are cutting back on further investment on production capacity. The conditions in the macro-environment have also caused huge reductions in employment levels, further weakening the downstream industries that depend on manufacturing, especially the consumptive sectors.

Foreign Exchange Markets

As indicated in figure 2.3, Zimbabwe has had in the past six years, two foreign exchange markets running parallel to one another. These are the official market and the parallel market. Most of the available foreign exchange is from the parallel market, where it is more expensive to acquire. In Zimbabwe, where the local currency is not convertible, foreign currency is key to the survival of manufacturing companies. The manufacturing sector heavily relies on imports in the form of raw materials, spares and capital to generate productivity. The inadequacy of foreign currency is the reason significant portions of plants are going without maintenance for sometime, deferring any scheduled maintenance. The result being massive breakdowns that have created a lot of down time and slowed down the production process. The shortages continued to stifle certainty in business planning, and hence raising transactions costs in industry. Foreign currency induced input supply bottlenecks continued to strain availability of strategic raw material imports, and hence continuity in production profiles in the period due to the scarcity of foreign currency.

Investment in technology

Firms in the manufacturing sector have increased their investment in new technology in the past six years despite the difficult economic conditions prevailing in the country. This could be attributed to the need to follow global trends in technological changes. Manufacturing firms have no choice but to allocate enough funds for the acquisition of new technology, sometimes through plant modifications in an effort to improve on efficiencies and contain costs.

Impact of the political environment

The research has established that the inconsistencies in political policy have impacted negatively on the performance of the manufacturing sector in Zimbabwe. For example the development of the parallel market is mainly due to the interference of politics in economic issues. The monetary authorities' ability to effectively manage the monetary system has been curtailed by political interference. All these factors have made it difficult for manufacturers to plan production more accurately.

Impact of the social environment

It has been established in this research that the social fabric in Zimbabwe has been changing to the detriment of the manufacturing sector. Although research found out that operation skills have been retained, jobs are being lost due to company closures. Formal employment in the country, according to data in figure 2.2 has fallen to below 1,000,000 in a country with a population of about 13,000,000. The earning labour is the backbone of a vibrant manufacturing sector because it supports the consumption of manufactured output. Without adequate formal employment, firms will naturally scale down on production, or will simply return to core business in order to avoid further losses. For this reason, the rate of diversification in the manufacturing industry has fallen drastically. Table 2.3 confirms this finding.

5.2.2 EFFECT OF INDUSTRY FACTORS ON MANUFACTURING

Having analyzed the impact of external forces on the performance of the manufacturing sector, it was the approach of this research to also look for factors within the industry itself that have had an impact, negative or positive, on the performance of the industry. The following findings and conclusions have been made:

If the performance of the whole manufacturing sector depended entirely on endogenous factors, then it would not have been possible for all sub-sectors in manufacturing to decline at the same time. The research has revealed that all the sub-sectors of the manufacturing industry have been under performing since 2000. The reason behind this is that the rest of the economy has been performing below par.

The manufacturing industry is but just a part of a wider spectrum of industrial networks. The non-performance of the other industries, both upstream and downstream will impact negatively on the manufacturing industry. The research shows that upstream industries such as agriculture, forestry and mining have been performing below par. On the other hand, downstream industries such as retailing, tourism and leisure have also not been

doing well. This has impacted negatively on the operations of the manufacturing sector, which relies heavily on these industries.

Given the above two findings, it may be concluded that exogenous factors, those that affect the rest of the industry, are actively at play. These factors have been cited in 5.1 above. Since industry sub-sectors are closely networked, it is difficult to isolate the effects of poor performance in one industry from the rest of the other sub-sectors, especially if the factors affecting the poor performer are beyond its control.

Production in the manufacturing sector has become more unpredictable and costly, compelling some companies to opt for the importation of finished goods and supplying the domestic market, ahead of production. This, of cause, is at the expense of domestic manufacturing output. As reflected in figure 2.1, manufacturing output has not recovered since the peak of 1996.

5.2.3 FACTORS RELATING TO THE COMPANIES IN MANUFACTURING

Capacity Utilisation

The philosophy behind this model is that the production system and processes should be flexible enough to allow for the automatic utilisation of excess capacity as well as handling of buffers where production bottlenecks could occur. Research has revealed that the designs of plants in Zimbabwe's manufacturing sector do not permit the flexibility requirement of this model. This means that the use of this model in Zimbabwe is very limited, and very few companies surveyed are using this model. This model does not work in mass-production situations, hence a number of Zimbabwean firms involved in mass production, which is quite substantial, find this technique of little use.

The current shortages of foreign currency to import raw materials and spares used in the production process in Zimbabwe have created idle capacity in most companies. Demand forces have not driven responses to capacity utilisation but instead capacity utilisation has been driven by inadequate inputs and a deteriorating infrastructure. The foregoing

challenges have caused a reduction in the level of capacity utilisation for most manufacturing companies to between 26% and 49%, with very few production plants achieving a level of 75%. In an effort to meet production targets some manufacturing companies are engaging in outsourcing the production of some of their product lines.

Manufacturing processes are highly capital intensive. The majority of Zimbabwe's manufacturing companies; particularly those producing perishables tend to follow the chase demand option when faced with capacity utilisation problems. The capacity utilisation model has an advantage of minimising the holding of inventory and the related costs.

The research has also revealed that despite the fact that some of the companies in the manufacturing sector have made efforts to apply recommended and appropriate strategies and operations models, there has been very little benefit derived. This can be attributed to the existing conditions that are not conducive to business operations.

Partnerships

Partnerships with foreign companies has given Zimbabwean companies access to foreign currency, and a fair share of profitability and technical back up. This helps to revive the manufacturing industry since the industry claims there is very little government initiatives, to revive industry.

Total Quality Management (TQM)

The role of total quality management is to influence continuous improvement of the whole system involved in the production processes, which means all people, suppliers and processes. The TQM model ensures that all inputs into the production cycle are checked and certified for quality by the manufacturer. From the research, TQM is being practiced to a limited extent. The quality standards have been going down in Zimbabwe.

For this reason some firms in Zimbabwe have been finding it difficult to penetrate export markets to counter the dwindling domestic market.

5.3 TEST OF THE HYPOTHESIS

In order to test the hypothesis that the manufacturing sector's failure to strategically reposition itself in the current socio-economic circumstances is the major contributor to its present distress, T-test was used. Variables which were used are shown in the list below in Table 5.1

Table 5.1 Testing of the Hypothesis

One-Sample Test

	Test Value = 0.005					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
EFS	15.611	48	.000	1.44	1.26	1.63
SA	24.650	48	.000	1.67	1.53	1.80
CU	13.816	48	.000	1.71	1.46	1.96
IE	25.388	48	.000	1.69	1.56	1.82
FLEXIBIL	22.455	48	.000	3.67	3.34	4.00

EFS stands for Effectiveness of strategies for manufacturing companies

SA stands for skills availability

CU stands for capacity utilisation

IE stands for Internal and External factors

FLEXIBL Flexibility of operations in this environment

The calculated statistics are 0.000 which are less than test value of 0.005. This implies that we reject the null hypothesis and conclude that there is not enough evidence to conclude that manufacturing sector's failure to strategically reposition itself in the current socio-economic circumstances is the major contributor to its present distress.

5.4 RECOMMENDATIONS

The major reason for the poor performance of the manufacturing sector is lack of financial muscle because of their continued focus on the uneconomic and unstable Zimbabwe environment. It is recommended that companies in the manufacturing sector increase their presence in markets outside Zimbabwe to enable them to transfer resources to improve local operations. This strategy could involve investing or taking over subsidiaries in neighbouring states. However, the strategy is more suitable for firms that produce export oriented products.

For those firms who are not involved in exports, it is recommended that they come together in a resource pooling strategy. This strategy will enable them to pool together the little resources that they have in order to invest, and purchase plant and equipment that produces a common output. This strategy is in a way co-operative competition. This will ensure that the firms have a smooth flow of inputs as well as control over the supply of inputs.

5.5 AREA OF FURTHER STUDY

An area of further study is presented to determine the feasibility and effectiveness of the Resource Pooling Strategy for manufacturing companies in Zimbabwe.

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APPENDICES

QUESTIONNAIRE FOR STAFF AND MANAGEMENT

SECTION A: GENERAL QUESTIONS

1. What is your position in the organisation?

_____

2. For how long have you been in the manaufacturing industry?

a. less than a year [ ]

b. 1-5 years [ ]

c. 5-10 years [ ]

d. Over 10 years [ ]

3. How would you evaluate the performance of your organisation for the past five years?

a. It was growing [ ]

b. It was growing slowly [ ]

c. Not growing [ ]

d. Performance was declining to be poor [ ]

SECTION B: OPERATIONS

4. What operational systems are being used by your organisation?

Can you please list them in the space provided below

_____

_____

_____

_____

_____

_____

_____

_____

5. Are the systems effective ?

a. Yes [ ]

b. No [ ]

6. If no to the above question, what is hendering them from operating effectively?

a. Internal factors

_____

_____

_____

_____

_____

_____

b. External factors

_____

_____

_____

_____

_____

_____

7. How flexible are your operations systems to the current environment?

a. Yes [ ]

b. No [ ]

8. Do you have a research and development department?

a. Yes [ ]

b. No [ ]

9. If yes to the question above, how has it contributed to improvements in the current design of production process systems?

_____

_____

_____

_____

_____

10. Is it possible to change the plant design to accommodate new strategies?

a. Yes [ ]

b. No [ ]

11. If yes to the above question, have you made use of the flexibility of your plant?

a. Yes [ ]

b. No [ ]

12. If yes to question 11 above, can you please list the benefits dereived from the plant modifications?

_____

_____

_____

_____

_____

13. Business Process Re-engineering (BPR) is used often used by many companies as a disaster recovery program. Has your company once used this process?

a. Yes [ ]

b. No [ ]

14. The process of BPR aims to achieve the following goals. If yes to the above question, can you please confirm whether your organisation achieved them?

a. Redesign of business processes [ ]

b. Quality of products [ ]

c. Flexibility of operations [ ]

d. Speed and service [ ]

e.

Other_____

_____

_____

_____

_____

15. In your own view, can you comment on the flexibility of your organisation ability to rapidly increase or decrease production levels in response to demand situations?

Can you please tick relevantly?

1=Very good	2=Good	3=Average	4=Poor	5=Very poor
1	2	3	4	5

16. Capacity is described as the amount of resource inputs available relative to output requirements at a particular time. What is negatively affecting your own organisation to meet its production capacity?

Can you please list the factors in the spcae provided below

_____

_____

_____

_____

_____

17. Please indicate the level of capacity utilisation of your plant?

a. Below 25% [ ]

b. Between 26% and 49% [ ]

c. Between 50% and 75% [ ]

d. 75% and above [ ]

18.In manufacturing, production is key, how well have you met your targets?

a. Below 25% [ ]

b. Between 26% and 49% [ ]

c. Between 50% and 75% [ ]

d. 75% and above [ ]

19. What is your organisation doing to meet the imbalances in production?

_____

_____

_____

20. Benchmarking is the use of best practices from other organisations in similar operations. In your own view, is your organisation using benchmarking as a tool?

a. Yes [ ]

b. No [ ]

21. What benefits have you derived from the use of benchmarking in your organisation?

_____

_____

_____

_____

_____

SECTION D: MACRO-ECONOMIC ENVIRONMENT

22. What operations strategies do you have in place to sustain the company in this environment?

_____

_____

_____

_____

_____

23. How effective have these strategies been?

a. Not effective at all [ ]
b. Less effective [ ]
c. Very effective [ ]

24. Can you please explain why the strategies were not effective?

_____

_____

_____

_____

25. Do you export some of your products?

a. Yes [ ]
b. No [ ]

26. If yes to the above, what did your organisation benefit out of the export earnings?

_____

_____

_____

_____

27. Have you entered into any partnerships in and outside the country?

a. Yes [ ]

b. No [ ]

28. If yes to question 27 above, can you please tell us the benefits derived from such partnerships?

_____

_____

_____

_____

29. What difficulties were encountered in procuring raw materials?

_____

_____

_____

_____

_____

30. How have you managed to overcome these procurement challenges?

_____

_____

_____

_____

31. Do you have adequate skills in the operations department?

a. Yes [ ]

b. No [ ]

32. If no to the above question, can you please explain why?

_____

_____

33. What efforts are there to reduce the impact of the above factors in question 32?

34. Have there been any government initiatives to revive industry in the past five years?

35. If yes how has your company benefited from such initiatives?

SECTION E: RECOMMENDATIONS

36. What other recommendations do you have for the manufacturing sector of Zimbabwe with regards to its operational strategies to survive in this harsh economic environment?

THANK YOU FOR YOUR TIME AND EFFORT

END OF QUESTIONNAIRE

RESEARCH OFFICE (GOVAN MBEKI CENTRE)
WESTVILLE CAMPUS
TELEPHONE NO.: 031 – 2603587
EMAIL : ximbap@ukzn.ac.za

UNIVERSITY OF
KWAZULU-NATAL

23 JANUARY 2007

MS. S DINHA (201509081)
GRADUATE SCHOOL OF BUSINESS

Dear Ms. Dinha

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/06904A

I wish to confirm that ethical clearance has been granted for the following project:

"Manufacturing company failure and underperformance in the manufacturing sector a major concern threatening survival of industry"

Yours faithfully

.....
MS. PHUMELELE XIMBA
RESEARCH OFFICE

cc. Faculty Officer (Christel Haddon)
cc. Supervisor (Dr. A Gani)